



SERVICE MANUAL

SOLID-STATE CONTROL SELF-CONTAINED CUBER

**Model IM-132U-21, 130 BAB-21
IM-132U-25,
IM-212U-21, 210 BAB-21**

TABLE OF CONTENTS

I. SPECIFICATIONS	1
1. NAMEPLATE	1
2. DIMENSIONS/CONNECTIONS	2
3. SPECIFICATIONS	3
II. GENERAL INFORMATION	10
1. INTRODUCTION	10
a. CONSTRUCTION	10
b. PRINCIPLE OF OPERATION - How it works	11
2. CONTROLLER BOARD	12
a. CONTROLLER BOARD	12
b. SEQUENCE	13
c. BOARD SCHEMATIC	14
d. WATER SUPPLY MODE	15
e. CONTROLS AND ADJUSTMENT - IM-132U, 130BAB	16
f. CONTROLS AND ADJUSTMENT - IM-212U, 210BAB	18
g. REMOVAL AND REPLACEMENT OF THERMISTOR (CUBE CONTROL)	21
III. INSTALLATION AND OPERATING INSTRUCTIONS	22
1. UNPACKING	22
2. LOCATION	23
3. ELECTRICAL CONNECTION	23
4. WATER SUPPLY AND DRAIN CONNECTIONS	24
5. FINAL CHECK LIST	25
6. STARTUP	26
7. SHUTOFF	27
8. BIN CONTROL	28
IV. MAINTENANCE AND CLEANING INSTRUCTIONS	29
1. MAINTENANCE	29
a. EXTERIOR	29
b. AIR FILTER	29
c. CONDENSER	29
d. WATER VALVE	29
e. STRAINER (Optional Extra)	30
2. CLEANING AND SANITIZING	30
a. WATER SYSTEM - IM-132U, 130BAB	30
b. WATER SYSTEM - IM-212U, 210BAB	31
c. STORAGE BIN AND SCOOP	32
V. TECHNICAL INFORMATION	34
1. WATER CIRCUIT AND REFRIGERANT CIRCUIT	34
a. IM-132U, 130BAB	34
b. IM-212U, 210BAB	35
2. WIRING DIAGRAM	36
a. IM-132U, 130BAB	36
b. IM-212U, 210BAB	37
3. TIMING CHART	38
a. IM-132U, 130BAB	38
b. IM-212U, 210BAB	39

TABLE OF CONTENTS

4. PERFORMANCE DATA	40
a. IM-132U-21, 130BAB-21	40
b. IM-132U-25	42
c. IM-212U-21, 210BAB-21	44
VI. SERVICE DIAGNOSIS	46
1. NO ICE PRODUCTION	46
2. LOW ICE PRODUCTION	49
3. ABNORMAL ICE	50
4. OTHERS	52
VII. CHECKING CONTROLLER BOARD	53
1. CHECKING CONTROLLER BOARD	53
2. BEFORE CHECKING CONTROLLER BOARD	54
3. VISUAL CHECK AND VOLTAGE CHECK	55
4. REPLACEMENT	56
VIII. REMOVAL AND REPLACEMENT	57
1. REMOVAL OF PANELS	57
2. SERVICE FOR REFRIGERANT LINES	58
a. REFRIGERANT DISCHARGE	58
b. EVACUATION AND RECHARGE	59
3. REMOVAL AND REPLACEMENT OF COMPRESSOR	59
4. REMOVAL AND REPLACEMENT OF DRIER	60
5. REMOVAL AND REPLACEMENT OF EXPANSION VALVE	61
6. REMOVAL AND REPLACEMENT OF EVAPORATOR	62
7. REMOVAL AND REPLACEMENT OF HOT GAS VALVE	63
8. REMOVAL AND REPLACEMENT OF WATER PAN ASSEMBLY	64
9. REMOVAL AND REPLACEMENT OF ACTUATOR MOTOR	65
10. REMOVAL AND REPLACEMENT OF CAM ARM	65
11. REMOVAL AND REPLACEMENT OF PUMP MOTOR	66
12. REMOVAL AND REPLACEMENT OF WATER VALVE	66
13. REMOVAL AND REPLACEMENT OF FAN MOTOR	67
14. REMOVAL AND REPLACEMENT OF ACTUATOR TOGGLE SWITCH	67
15. REMOVAL AND REPLACEMENT OF BIN CONTROL.....	68

I. SPECIFICATIONS

1. NAMEPLATE



Fig. 1 Nameplate

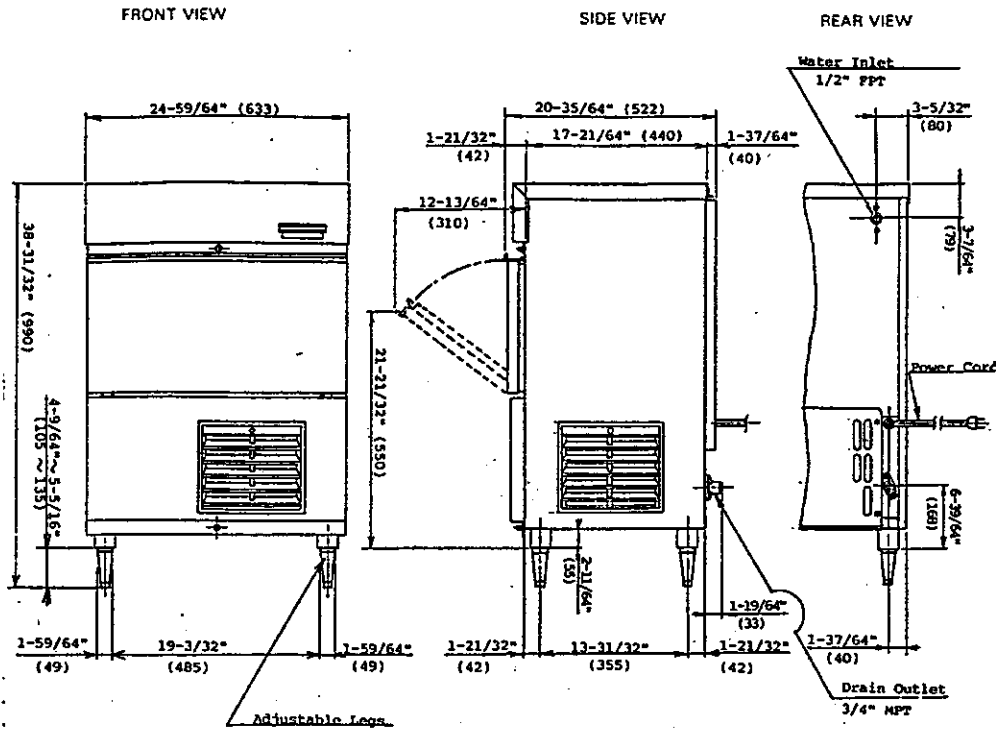
See NAMEPLATE for electrical and refrigeration specifications. This nameplate is located on the upper, right part of the Left Side Panel.

We reserve the right to make changes in specifications and design without prior notice.

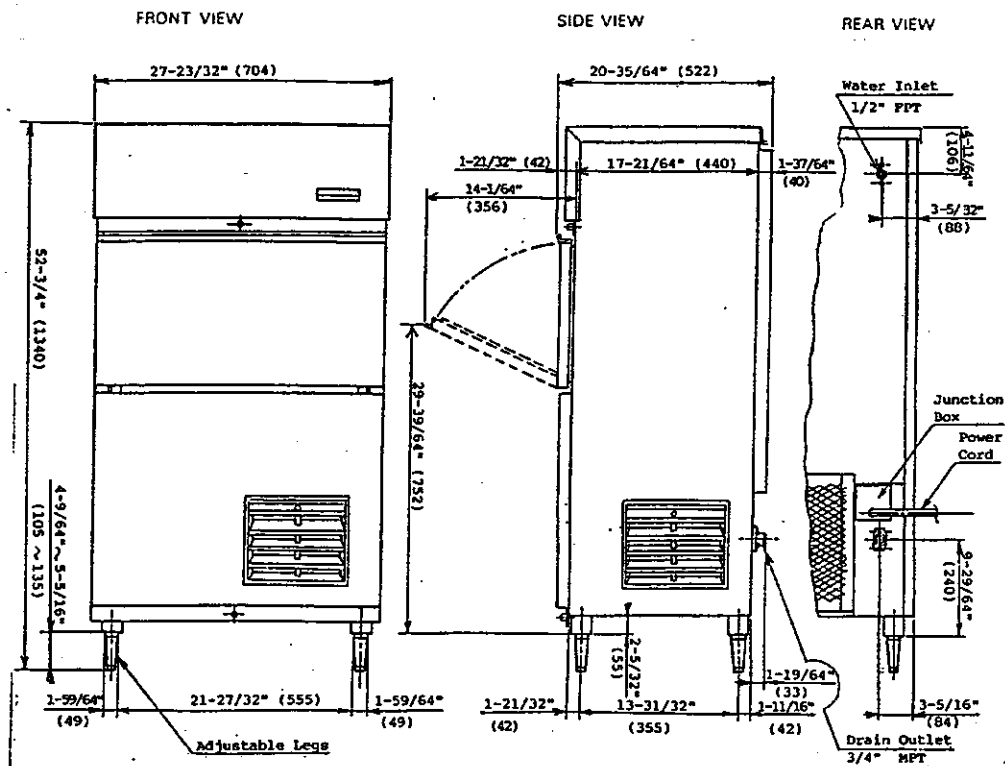
2. DIMENSIONS/CONNECTIONS

Unit: inch

IM-132U, 130BAB



IM-212U, 210BAB



NOTE: * For best performance, allow a minimum of six (6) inch space on each side for air circulation.

Fig. 2 Dimensions/Connections

3. SPECIFICATIONS

SPECIFICATIONS

SPEC NO. 86097

ISSUED: JUNE 17, 1986

MODEL: SOLID-STATE CONTROL SELF-CONTAINED CUBER
IM-132U-21

NAMEPLATE RATING

AC SUPPLY VOLTAGE	115-120V 60Hz 1Phase
AMPERES	Freeze 5.1A, Harvest 5.8A
MAXIMUM FUSE SIZE	15A
MINIMUM CIRCUIT AMPACITY	15A
DESIGN PRESSURE	High 220PSI, Low 85PSI
REFRIGERANT	R12 8.5oz (240g)
DIMENSIONS (H x D x W)	39.0" x 20.6" x 24.9"
CONNECTIONS	
ELECTRICAL	Cord-connected
	SJT 14AWG, 9.2' Long
WATER SUPPLY AND DRAIN	Supply Inlet FPT 1/2" Female
	Drain Outlet MPT 3/4" Male
EXTERIOR	Stainless Steel
ACCESSORIES	Legs, Scoop, Manual, Brush
WEIGHT	Net 134Lbs (61kg)
	Shipping 148Lbs (67kg)

REFRIGERATION

ICEMAKING SYSTEM	Cell
COMPRESSOR	Hermetic 300W, Model JAE4440B
CONDENSER	Air-cooled
EVAPORATOR	Tin-plated Copper
DEFROST (HARVEST)	Hot gas and Gravity
REFRIGERANT CONTROL	Capillary tube

ELECTRICAL

CUBE CONTROL	Controller Board Type G09
DEFROST (HARVEST) CONTROL	Thermistor
WATER SUPPLY CONTROL	Thermistor
BIN CONTROL	Timer
	Microswitch

PROTECTION

COMPRESSOR	Overload (Auto reset)
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LIMITATIONS

AMBIENT TEMPERATURE	Min. 34°F - Max. 100°F
WATER TEMPERATURE	Min. 41°F - Max. 95°F
VOLTAGE VARIATION	Rated Voltage + or - 10%
WATER SUPPLY PRESSURE	Min. 7PSI - Max. 113PSI

ICE PRODUCTION

PER 24HR	Cube Size 0.8" x 0.8" x 0.6"
PER CYCLE	123Lbs (70/50°F), 95 (90/70)
FREEZE CYCLE TIME	1.3Lbs, 104Pcs.
STORAGE CAPACITY	12Min (70/50°F), 17 (90/70)
ELECTRICAL CONSUMPTION	57Lbs, Bin Control Set 40Lbs
WATER CONSUMPTION PER HR	430W (90/70°F, Average)
	12.4Gal (70/50°F), 9.5 (90/70)

SPECIFICATION NO.88070

ISSUED: July 8, 1988

ITEM HOSHIZAKI SELF CONTAINED CUBER
MODEL IM-130BAB-21BEGINNING SERIAL NO.
ENDING SERIAL NO.

AC SUPPLY VOLTAGE	115-120/60/1
AMPERAGE	Freeze 5.1A , Harvest 5.8A(AT. 90°F/WT. 70°F)
MINIMUM CIRCUIT AMPACITY	15A
MAXIMUM FUSE SIZE	15A

APPROXIMATE ICE PRODUCTION
PER 24HR.
lbs/day(kg/day)

Ambient Temp. (°F)	Water Temp. (°F)		
	50	70	90
70	123(56)	106(48)	93(42)
80	117(53)	101(46)	83(38)
90	108(49)	95(43)	84(38)
100	99(45)	88(40)	79(36)

SHAPE OF ICE
ICE PRODUCTION PER CYCLE
APPROXIMATE STORAGE CAPACITYCube Ice(0.8"x0.8"x0.6")
1.3lbs. (0.6kg) 104Pcs;
57lbs. Bin Control Set 40lbs.PERFORMANCE
ELECTRIC CONSUMPTION
WATER CONSUMPTION PER 24HR.

AT. 90°F/WT. 70°F	AT. 70°F/WT. 50°F	See details of PERFORMANCE DATA NO. 88070
430W	385W	
229gal.	297gal.	

EXTERIOR DIMENSIONS(WxDxH)
EXTERIOR FINISH
WEIGHT
CONNECTIONS - ELECTRIC
- WATER SUPPLY
- DRAIN24.9"x20.6"x39" (633x522x990mm)
Stainless Steel, Galvanized Steel(Rear)
Net 134lbs. (61kg) Shipping 148lbs. (67kg)
Cord Connection
Inlet 1/2" FPT
Outlet 3/4" MPTCUBE CONTROL SYSTEM
HARVESTING CONTROL SYSTEM
ICE MAKING WATER CONTROL
COOLING WATER CONTROL
BIN CONTROL SYSTEMThermistor
Thermistor
Timer
N/A
MicroswitchCOMPRESSOR
CONDENSER
EVAPORATOR
REFRIGERANT CONTROL
REFRIGERANT CHARGE
DESIGN PRESSUREHermetic Model JAE4440B
Air-cooled, Fin and Tube type
Tin-plated copper tube on sheet and copper cells
Capillary tube
R12, 8.5oz. (240g)
High 220PSIG, Low 85PSIG

COMPRESSOR PROTECTION

Auto-reset Overload Protector (Internal)

ACCESSORIES

Ice Scoop , Legs , Brush

OPERATION CONDITIONS

VOLTAGE RANGE	Rated voltage $\pm 10\%$
AMBIENT TEMP.	34-100°F
WATER SUPPLY TEMP.	41- 95°F
WATER SUPPLY PRESS.	7-113PSIG

DRAWING NO. (DIMENSIONS)

4H3025

• We reserve the right to make changes in specifications and design without prior notice.

IMPORTANT: The data should be used as a bench mark.
Allow 10% variation from data for errors.

MODEL IM-130BAB-21 (Air-cooled)

APPROXIMATE ICE PRODUCTION PER 24HR.	Ambient Temp. (°F)	Water Temp. (°F)		
		50	70	90
lbs./day (kg/day)	70	123(56)	106(48)	93(42)
	80	117(53)	101(46)	83(38)
	90	108(49)	95(43)	84(38)
	100	99(45)	88(40)	79(36)
APPROXIMATE ELECTRIC CONSUMPTION	70	385	395	405
	80	410	420	430
	90	420	430	440
	100	430	440	460
APPROXIMATE WATER CONSUMPTION PER 24HR.	70	297(1.1)	253(1.0)	221(0.8)
	80	278(1.1)	239(0.9)	210(0.8)
	90	257(1.0)	229(0.9)	202(0.8)
	100	236(0.9)	208(0.8)	185(0.7)
FREEZING CYCLE TIME	70	12	14	17
	80	13	16	18
	90	15	17	19
	100	16	19	21
HARVEST CYCLE TIME	70	3.0	3.0	3.0
	80	2.5	2.5	2.5
	90	2.3	2.3	2.3
	100	2.0	2.0	2.0
HEAD PRESSURE	70	118(8.3)	124(8.7)	128(9.0)
	80	137(9.6)	144(10.1)	149(10.5)
	90	156(11.0)	164(11.5)	168(11.8)
	100	181(12.7)	189(13.3)	196(13.8)
SUCTION PRESSURE	70	14(1.0)	16(1.2)	18(1.3)
	80	16(1.1)	18(1.3)	21(1.5)
	90	18(1.3)	21(1.5)	23(1.6)
	100	20(1.4)	22(1.6)	26(1.8)

Note: Pressure data is recorded first 5 minutes in freezing cycle.

SPECIFICATIONS

SPEC NO. 85076 ISSUED: AUG. 20, 1985
 MODEL: SOLID-STATE CONTROL SELF-CONTAINED CUBER
 IM-132U-25

NAMEPLATE RATING

AC SUPPLY VOLTAGE	115-120V 60Hz 1Phase
AMPERES	Freeze 5.1A, Harvest 5.8A
MAXIMUM FUSE SIZE	15A
MINIMUM CIRCUIT AMPACITY	15A
DESIGN PRESSURE	High 220PSI, Low 85PSI
REFRIGERANT	R12 8.5oz (240g)
DIMENSIONS (H x D x W)	39.0" x 20.6" x 24.9"
CONNECTIONS	
ELECTRICAL	Cord-connected
	SJT 14AWG, 9.2' Long
WATER SUPPLY AND DRAIN	Supply Inlet FPT 1/2" Female
	Drain Outlet MPT 3/4" Male
EXTERIOR	Stainless Steel
ACCESSORIES	Legs, Scoop, Manual, Brush
WEIGHT	Net 134Lbs (61kg)
	Shipping 148Lbs (67kg)

REFRIGERATION

ICEMAKING SYSTEM	Cell
COMPRESSOR	Hermetic 300W, Model JAE4440B
CONDENSER	Air-cooled
EVAPORATOR	Tin-plated Copper
DEFROST (HARVEST)	Hot gas and Gravity
REFRIGERANT CONTROL	Capillary tube

ELECTRICAL

CUBE CONTROL	Controller Board Type G05
DEFROST (HARVEST) CONTROL	Thermistor
WATER SUPPLY CONTROL	Thermistor
BIN CONTROL	Timer
	Microswitch

PROTECTION

COMPRESSOR	Overload (Auto reset)
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LIMITATIONS

AMBIENT TEMPERATURE	Min. 34°F - Max. 100°F
WATER TEMPERATURE	Min. 41°F - Max. 95°F
VOLTAGE VARIATION	Rated Voltage + or - 10%
WATER SUPPLY PRESSURE	Min. 7PSI - Max. 113PSI

ICE PRODUCTION

PER 24HR	Cube Size 1" x 1" x 0.9"
PER CYCLE	123Lbs (70/50°F), 95 (90/70)
FREEZE CYCLE TIME	1.6Lbs, 56Pcs.
STORAGE CAPACITY	15Min (70/50°F), 22 (90/70)
ELECTRICAL CONSUMPTION	57Lbs, Bin Control Set 40Lbs
WATER CONSUMPTION PER HR	440W (90/70°F, Average)
	9.7Gal (70/50°F), 7.4 (90/70)

SPECIFICATIONS

SPEC NO. 85075

ISSUED: AUG. 20, 1985

MODEL: SOLID-STATE CONTROL SELF-CONTAINED CUBER
IM-212U-21

NAMEPLATE RATING

AC SUPPLY VOLTAGE 115-120V 60Hz 1Phase
AMPERES Freeze 8.2A, Harvest 9.0A

MAXIMUM FUSE SIZE 15A

MINIMUM CIRCUIT AMPACITY 15A

DESIGN PRESSURE High 210PSI, Low 85PSI

REFRIGERANT R12 12.3oz (350g)

DIMENSIONS (H x D x W) 52.8" x 20.6" x 27.7"

CONNECTIONS

ELECTRICAL Cord-connected
SJT 14AWG, 9.2' Long
Supply Inlet FPT 1/2" Female
Drain Outlet MPT 3/4" Male

WATER SUPPLY AND DRAIN Stainless Steel

EXTERIOR

ACCESSORIES

WEIGHT

Legs, Scoop, Manual
Net 187Lbs (85kg)
Shipping 202Lbs (92kg)

REFRIGERATION

ICEMAKING SYSTEM Cell
COMPRESSOR Hermetic 400W, Model CL50J-1
CONDENSER Air-cooled
EVAPORATOR Tin-plated Copper
DEFROST (HARVEST) Hot gas and Gravity
REFRIGERANT CONTROL Thermostatic Expansion Valve

ELECTRICAL

CUBE CONTROL Controller Board Type G06
DEFROST (HARVEST) CONTROL Thermistor
WATER SUPPLY CONTROL Thermistor
BIN CONTROL Timer
Microswitch

PROTECTION

COMPRESSOR Overload (Auto reset)

LIMITATIONS

AMBIENT TEMPERATURE Min. 34°F - Max. 100°F
WATER TEMPERATURE Min. 41°F - Max. 95°F
VOLTAGE VARIATION Rated Voltage + or - 10%
WATER SUPPLY PRESSURE Min. 7PSI - Max. 113PSI

ICE PRODUCTION

PER 24HR Cube Size 0.8" x 0.8" x 0.6"
PER CYCLE 198Lbs (70/50°F), 154 (90/70)
2.5Lbs, 190Pcs.

FREEZE CYCLE TIME 16Min (70/50°F), 22 (90/70)

STORAGE CAPACITY

121Lbs, Bin Control Set 62Lbs

ELECTRICAL CONSUMPTION 770W (90/70°F, Average)

WATER CONSUMPTION PER HR 7.9Gal (70/50°F), 4.2 (90/70)

SPECIFICATION NO.88071

ISSUED: July 8, 1988

ITEM HOSHIZAKI SELF CONTAINED CUBER
MODEL IM-210BAB-21BEGINNING SERIAL NO.
ENDING SERIAL NO.

AC SUPPLY VOLTAGE	115-120/60/1																								
AMPERAGE	Freeze 8.2A , Harvest 9.0A(AT. 90°F/WT. 70°F)																								
MINIMUM CIRCUIT AMPACITY	15A																								
MAXIMUM FUSE SIZE	15A																								
APPROXIMATE ICE PRODUCTION PER 24HR. lbs/day(kg/day)	<table><tr><th>Ambient Temp. (°F)</th><th colspan="3">Water Temp. (°F)</th></tr><tr><th></th><th>50</th><th>70</th><th>90</th></tr><tr><td>70</td><td>198(90)</td><td>172(78)</td><td>157(71)</td></tr><tr><td>80</td><td>190(86)</td><td>163(74)</td><td>148(67)</td></tr><tr><td>90</td><td>181(82)</td><td>154(70)</td><td>139(63)</td></tr><tr><td>100</td><td>172(78)</td><td>146(66)</td><td>130(59)</td></tr></table>	Ambient Temp. (°F)	Water Temp. (°F)				50	70	90	70	198(90)	172(78)	157(71)	80	190(86)	163(74)	148(67)	90	181(82)	154(70)	139(63)	100	172(78)	146(66)	130(59)
Ambient Temp. (°F)	Water Temp. (°F)																								
	50	70	90																						
70	198(90)	172(78)	157(71)																						
80	190(86)	163(74)	148(67)																						
90	181(82)	154(70)	139(63)																						
100	172(78)	146(66)	130(59)																						
SHAPE OF ICE	Cube Ice(0.8"x0.8"x0.6")																								
ICE PRODUCTION PER CYCLE	2.5lbs. (1.1kg) 190pcs.																								
APPROXIMATE STORAGE CAPACITY	121lbs. Bin Control Set 62lbs.																								
PERFORMANCE	AT. 90°F/WT. 70°F	AT. 70°F/WT. 50°F	See details of																						
ELECTRIC CONSUMPTION	770W	700W	PERFORMANCE DATA																						
WATER CONSUMPTION PER 24HR.	101gal.	190gal.	NO.88071																						
EXTERIOR DIMENSIONS(WxDxH)	27.7"x20.6"x52.8" (704x522x1340mm)																								
EXTERIOR FINISH	Stainless Steel, Galvanized Steel(Rear)																								
WEIGHT	Net 187lbs. (85kg) Shipping 202lbs. (92kg)																								
CONNECTIONS - ELECTRIC	Cord Connection																								
- WATER SUPPLY	Inlet 1/2" FPT																								
- DRAIN	Outlet 3/4" MPT																								
CUBE CONTROL SYSTEM	Thermistor																								
HARVESTING CONTROL SYSTEM	Thermistor																								
ICE MAKING WATER CONTROL	Timer																								
COOLING WATER CONTROL	N/A																								
BIN CONTROL SYSTEM	Microswitch																								
COMPRESSOR	Hermetic Model CL50J-1U																								
CONDENSER	Air-cooled, Fin and Tube type																								
EVAPORATOR	Tin-plated copper tube on sheet and copper cells																								
REFRIGERANT CONTROL	Thermostatic Expansion Valve																								
REFRIGERANT CHARGE	R12, 12.3oz. (350g)																								
DESIGN PRESSURE	High 210PSIG, Low 85PSIG																								
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)																								
ACCESSORIES	Ice Scoop , Legs																								
OPERATION CONDITIONS	VOLTAGE RANGE	Rated voltage ±10%																							
	AMBIENT TEMP.	34-100°F																							
	WATER SUPPLY TEMP.	41- 95°F																							
	WATER SUPPLY PRESS.	7-113PSIG																							
DRAWING NO. (DIMENSIONS)	4H3026																								

• We reserve the right to make changes in specifications and design without prior notice.

IMPORTANT: The data should be used as a bench mark.
Allow 10% variation from data for errors.

MODEL IM-210BAB-21 (Air-cooled)

APPROXIMATE ICE PRODUCTION PER 24HR.	Ambient Temp. (°F)	Water Temp. (°F)		
		50	70	90
lbs./day (kg/day)	70	198(90)	172(78)	157(71)
	80	190(86)	163(74)	148(67)
	90	181(82)	154(70)	139(63)
	100	172(78)	146(66)	130(59)
APPROXIMATE ELECTRIC CONSUMPTION	70	700	740	750
watts	80	715	755	785
	90	740	770	795
	100	750	795	800
APPROXIMATE WATER CONSUMPTION PER 24HR.	70	190(0.72)	163(0.62)	149(0.56)
gal./day (m ³ /day)	80	144(0.55)	125(0.47)	113(0.43)
	90	118(0.45)	101(0.38)	91(0.34)
	100	101(0.38)	84(0.32)	77(0.29)
FREEZING CYCLE TIME	70	16	18	20
min.	80	17	20	22
	90	18	22	24
	100	19	23	26
HARVEST CYCLE TIME	70	3.0	3.0	3.0
min.	80	2.5	2.5	2.5
	90	2.2	2.2	2.2
	100	2.0	2.0	2.0
HEAD PRESSURE	70	108(7.6)	115(8.1)	122(8.6)
PSIG (kg/cm ² G)	80	128(9.0)	135(9.5)	142(10.0)
	90	146(10.3)	154(10.8)	161(11.3)
	100	172(12.1)	178(12.5)	186(13.1)
SUCTION PRESSURE	70	16(1.1)	20(1.4)	24(1.7)
PSIG (kg/cm ² G)	80	18(1.3)	21(1.5)	26(1.8)
	90	19(1.4)	23(1.6)	27(1.9)
	100	21(1.5)	24(1.7)	28(2.0)

Note: Pressure data is recorded first 5 minutes in freezing cycle.

II. GENERAL INFORMATION

1. INTRODUCTION

a. CONSTRUCTION

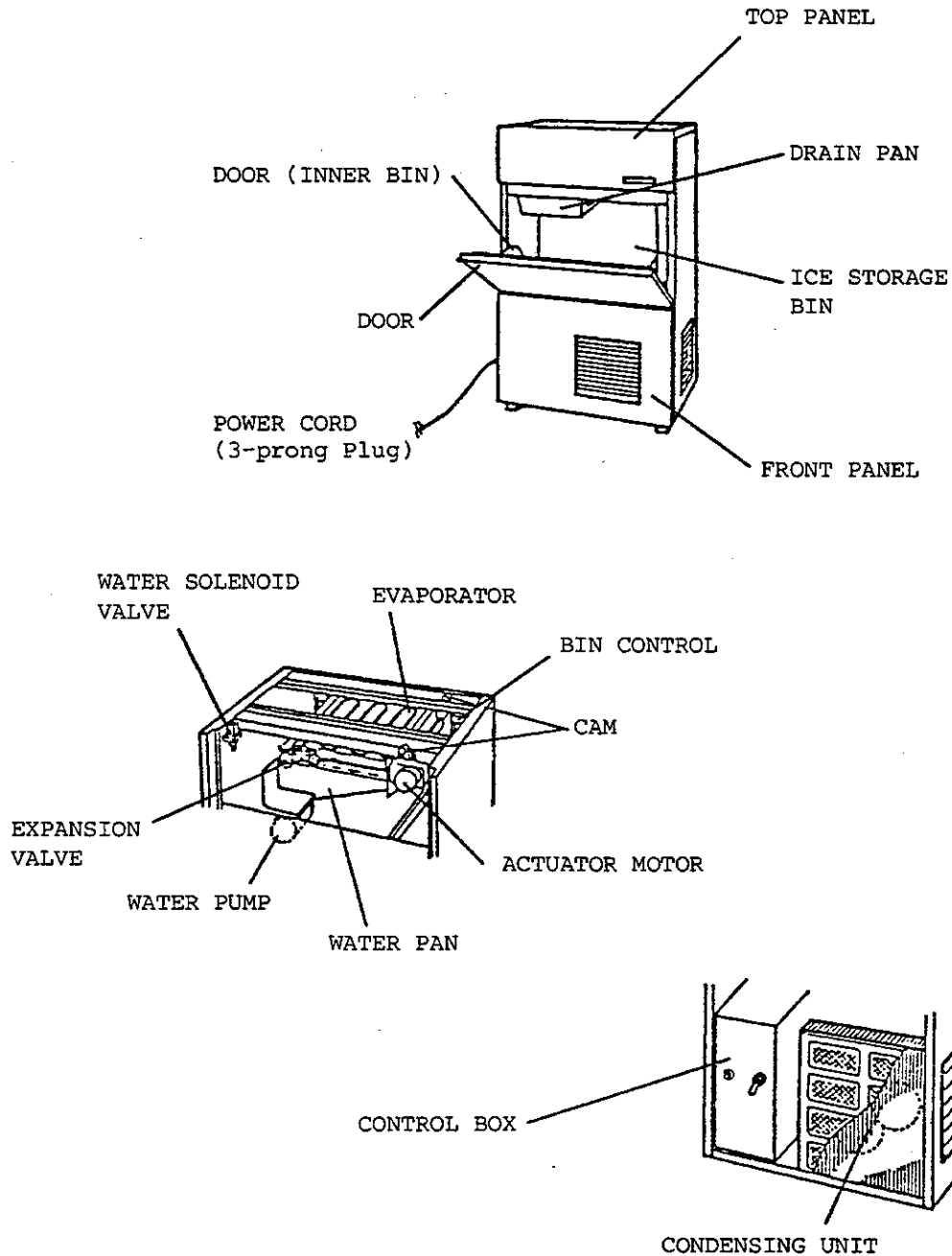


Fig. 3 Component Location

b. PRINCIPLE OF OPERATION - How it works

1) Initial Operation

Plugging in and moving toggle WASHING SWITCH to "ICE" position, energizes solid-state control module to start automatic ice making operation. First of all, compressor starts, and hot gas solenoid valve opens. And then actuator motor starts to rotate counterclockwise, and water pan assembly (water plate and water tank) opens. When switch actuator moves actuator toggle switch to the left "DEFROST" position, hot gas solenoid valve closes, and actuator motor rotates clockwise. And at the same time, water solenoid valve opens to start water supply, and condenser fan motor starts. Front cam moves actuator toggle switch to the right "FREEZE" position. Water solenoid valve closes to stop water supply in a certain period (IM-132U, -130BAB, 45 sec, IM-212U, -210BAB, 140 sec) after actuator toggle switch is moved to the right. Excess water overflows water tank into drain pan during water supply.

2) Freeze Cycle

Supplied water in water tank is pumped to be distributed through water plate, and sprayed into icemaking cells on evaporator through tiny holes on water plate. Water is circulated to exchange heat in icemaking cells, and changes into ice. Ice grows to form cube shape every cell. When ice cubes grow to standard size, cube control thermistor on evaporator or backup timer on solid-state control signals to complete freezing.

3) Defrost (Harvest) Cycle

When freeze cycle is completed, fan motor and pump motor stop. And then hot gas solenoid valve opens to start defrosting ice cubes. At the same time, actuator motor starts to rotate counterclockwise, and water pan assembly opens. When switch actuator moves actuator toggle switch to "DEFROST" position, actuator motor stops, and water solenoid valve opens to flush water plate surface for a certain period (IM-132U, -130BAB 85 sec, IM-212U, IM-210BAB, throughout cycle). Cube control thermistor signals to complete defrosting after all cubes drop into ice storage section. Actuator motor starts to rotate counterclockwise, and water pan assembly closes. And at the same time, hot gas solenoid valve closes and fan motor starts, and on IM-132U, -130BAB water solenoid valve opens to start water supply. When front cam moves actuator toggle switch to "FREEZE" position, actuator motor stops, and water solenoid valve closes on IM-132U, -130BAB. On IM-212U, -210BAB water solenoid valve closes in 15 sec after actuator toggle switch is moved to the right. And at the same time, pump motor starts into another freeze cycle.

2. CONTROLLER BOARD

a. CONTROLLER BOARD

===== [CAUTION] =====

The controller board is FRAGILE. Handle the board very carefully, to prevent damage to the board, electronic devices and connectors. An anti-static wrist strap must be worn, to prevent damage to the delicate circuitry due to static electricity. And always use miniature tools to adjust tiny parts.

=====

- o HOSHIZAKI EXCLUSIVE solid-state control is employed in IM-132U (-130BAB) and -212U (-210BAB) self-contained cubers.
- o Printed Circuit Board (hereafter called "Controller Board") includes stable and high-quality control system. Any complicated adjustment is not required. All models are pretested and factory adjusted.

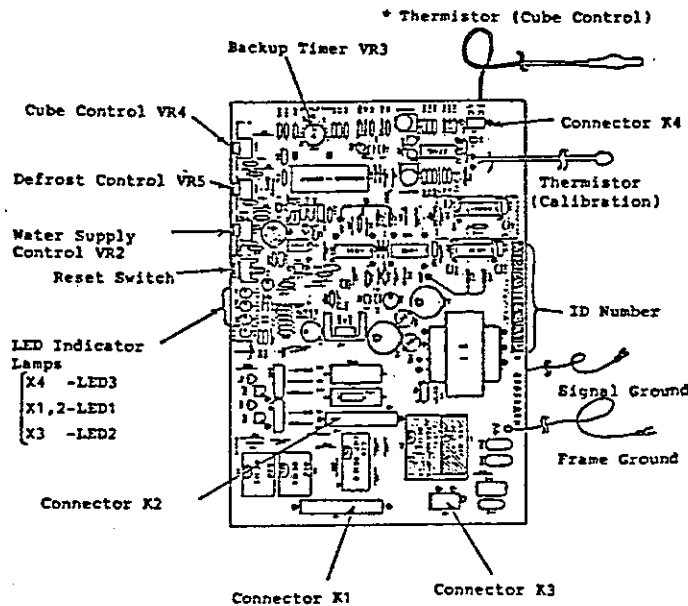


Fig. 4 Controller Board

Tab. 1 Applicable Controller Board

Model	Part Code
IM-132U-21, 130BAB-21	425495-09
IM-132U-25	425495-05
IM-212U-21, 210BAB-21	425495-06

b. SEQUENCE

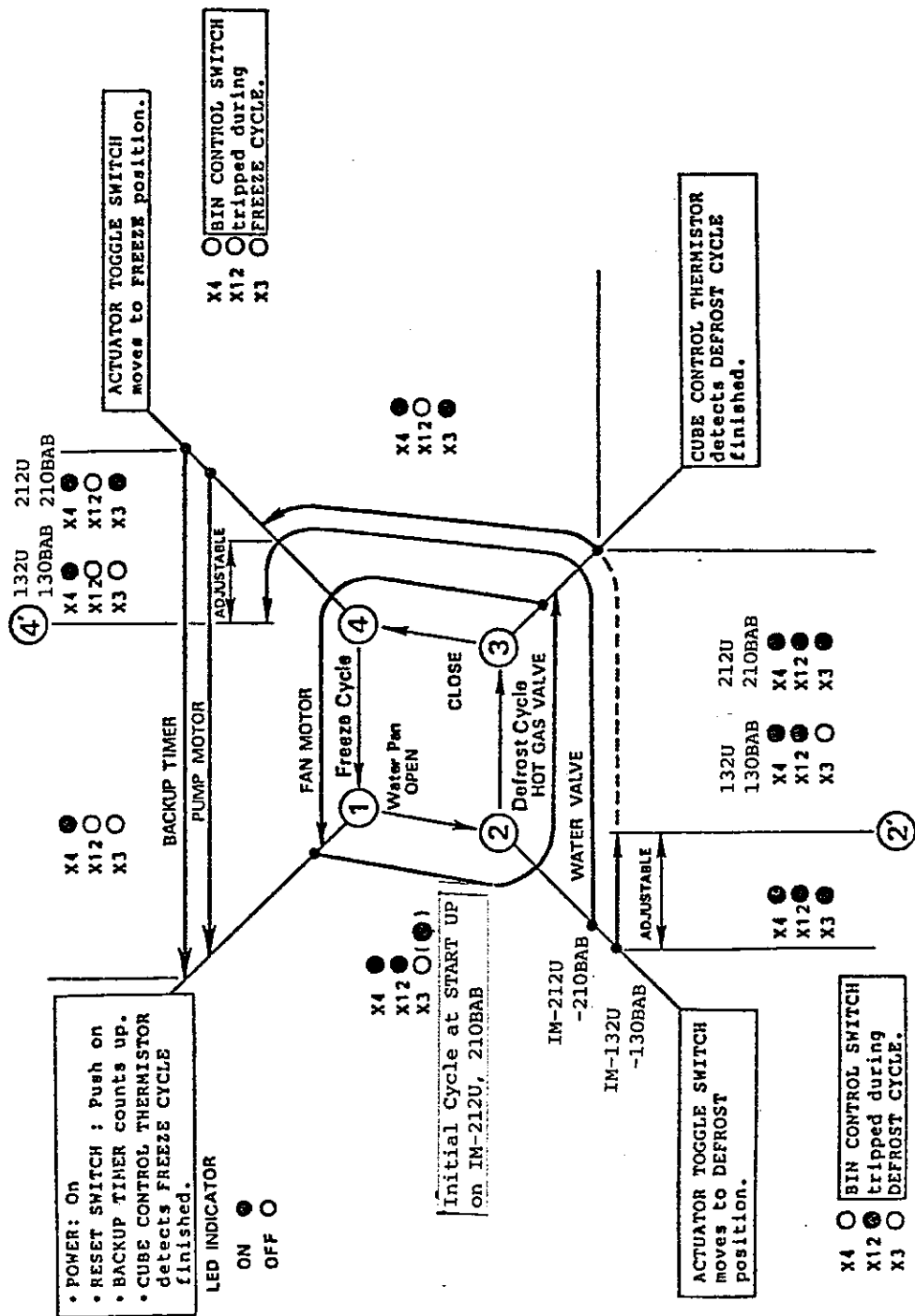


Fig. 5 Sequence

c. BOARD SCHEMATIC

- o A label, located on the reverse of Control Box Cover, shows a Schimatic of the Controller Board.

VR: Variable Resistor
No.2 through No.5 adjustable
K: Connector

⑦ K1 ① Connector No.1
With 7 (seven) pins
① Pin No.1

IC: Integrated Circuit Chip

JW: Jumper Wire

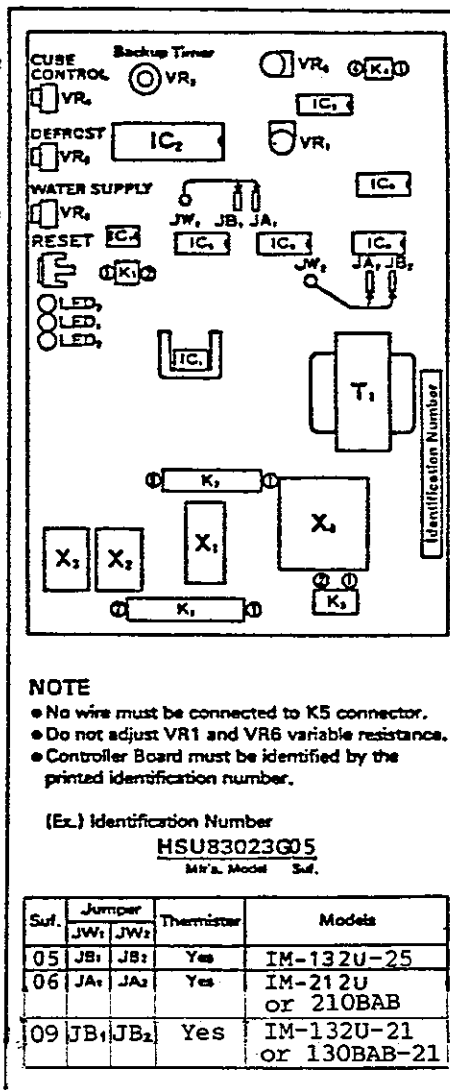
LED: Light Emitting Diode
Indicator Lamp

T: Transformer

X: Relay

RESET: Reset Switch

Push a botton only
during FREEZE CYCLE
when replace a board
or check operation.



Relay

X1 - ACTUATOR MOTOR and PUMP MOTOR

X2 - HOT GAS VALVE and FAN MOTOR

X3 - WATER VALVE

X4 - COMPRESSOR

Control

VR2 - WATER SUPPLY

VR3 - BACKUP TIMER

VR4 - CUBE

VR5 - DEFROST

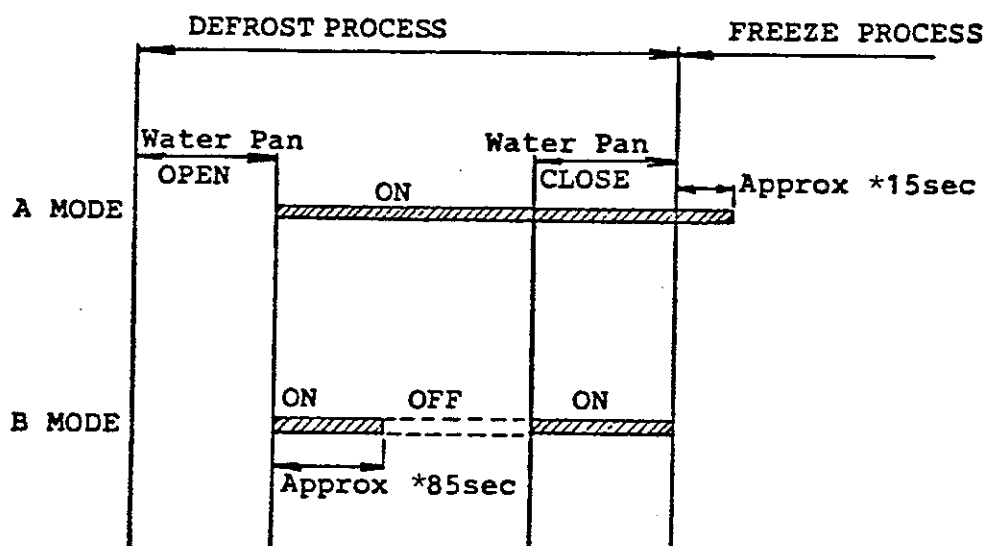
All controls are Factory Adjusted.
Do not change setting, except when
replace a board or setting changed.
Refer to "Adjustment".

Fig. 6 Board Schematic

d. WATER SUPPLY MODE

Tab. 2 Water Supply Mode

Controller Board ID Number	Water Supply Mode	Model
G05, G09	B	IM-132U, 130BAB
G06	A	IM-212U, 210BAB



* Adjustable 15 to 180 seconds

Fig. 7 Water Supply Mode

e. CONTROLS AND ADJUSTMENT - IM-132U, 130BAB

1. CUBE CONTROL

Cube control on controller board is factory adjusted to produce constant cubes all year around. When user needs cubes with smaller or larger diameter dimple, service personnel should adjust cube control on board as follows:

- 1) Adjust variable resistor VR4 (CUBE CONTROL) using miniature electrician or (-) screwdriver.
- 2) For smaller dimple cubes, adjust variable resistor VR2 (WATER SUPPLY CONTROL) using miniature electrician or (-) screwdriver, too.

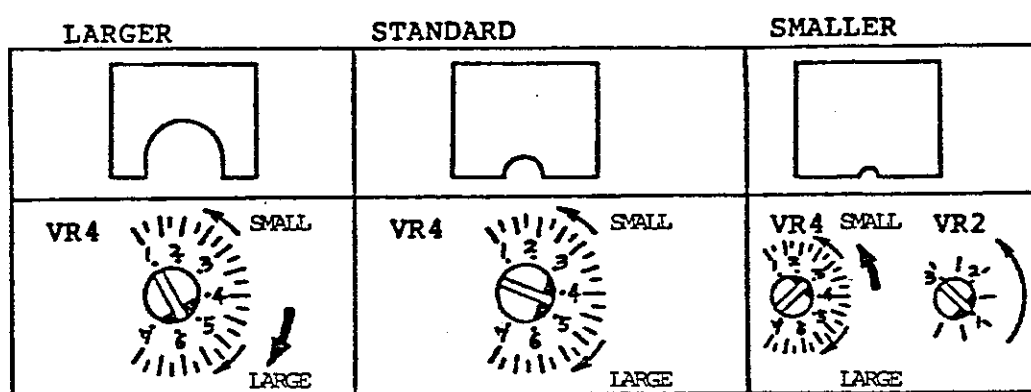


Fig. 8 Cube Control

2. BACKUP TIMER

Backup timer functions to stop freezing process on the way, when ambient temperature is higher or air filter gets being clogged (freeze cycle time will be too long). Factory setting is approximately 45 minutes. Any adjustment will not be required under normal use.

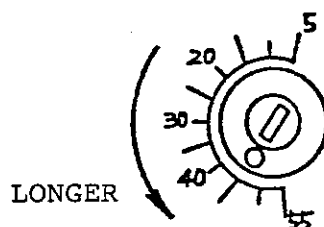


Fig. 9 Backup Timer

3. DEFROST CONTROL

Defrost control functions to control period between ice-drop and actuator motor restart. Any adjustment will not be required for normal operation. Factory setting and bench mark are shown in table below. When servicing or replacing controller board, adjust variable resistor VR5 (DEFROST CONTROL) using miniature electrician or (-) screwdriver.



Tab. 3 Approx Period (sec)

Ambient °F	Period
90	*20
70	40
50	60

* Factory setting

Fig. 10 Defrost Control

4. WATER SUPPLY CONTROL

Water supply control functions to control water solenoid valve operation. Any adjustment will not be required, except when servicing or replacing controller board. Use miniature electrician or (-) screwdriver to adjust variable resistor VR2 (WATER SUPPLY CONTROL).

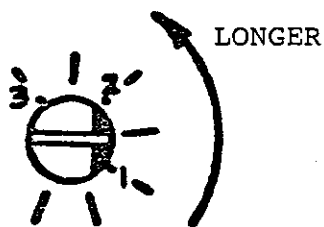


Fig. 11 Water Supply Control

f. CONTROLS AND ADJUSTMENT - IM-212U, 210BAB

1. CUBE CONTROL

Cube control on controller board is factory adjusted to produce constant cubes all year around. When user needs cubes with smaller or larger diameter dimple, service personel should adjust cube control on board as follows:

- 1) Adjust variable resistor VR4 (CUBE CONTROL) using miniature electrician or (-) screwdriver.

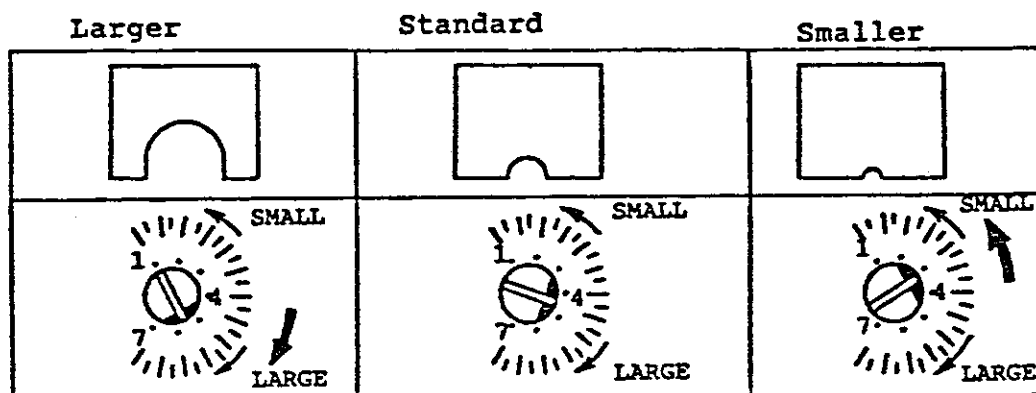


Fig. 12 Cube Control

2. BACKUP TIMER

Backup timer functions to stop freezing process on the way, when ambient temperature is higher or air filter gets being clogged (freeze cycle time will be too long). Factory setting is approximately 40 minutes. Any adjustment will not be required under normal use.

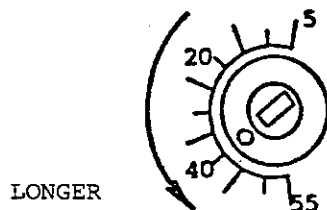


Fig. 13 Backup Timer

3. DEFROST CONTROL

Defrost control functions to control period between ice-drop and actuator motor restart. Any adjustment will not be required for normal operation. Factory setting and bench mark are shown in table below. When servicing or replacing controller board, adjust variable resistor VR5 (DEFROST CONTROL) using miniature electrician or (-) screwdriver.



Tab. 4 Approx Period (sec)

Ambient °F	Period
90	*20
70	40-50
50	70

* Factory setting

Fig. 14 Defrost Control

4. WATER SUPPLY CONTROL

Water supply control functions to control water solenoid valve operation. This control is factory adjusted, being set at the shortest (15sec) position. Any adjustment will not be required under normal use.

In high-hardness areas, adjust variable resistor VR2 (WATER SUPPLY CONTROL), using miniature electrician or (-) screwdriver. Rotate adjustment screw counterclockwise to 1.5 minutes (90 sec), recommended setting.

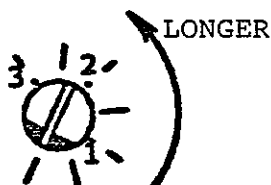


Fig. 15 Water Supply Control

Note: Hardness exceeding 250ppm Calcim Carbonate, results in production of cloudy ice or scale buildup in the water system.

And also, overflow pipe must be adjusted to "DRAIN" position, to prevent concentration of Calcium Carbonate, etc.

- 1) Remove thumbscrew, and rotate overflow pipe to "DRAIN" position.
- 2) Secure overflow pipe with thumbscrew.

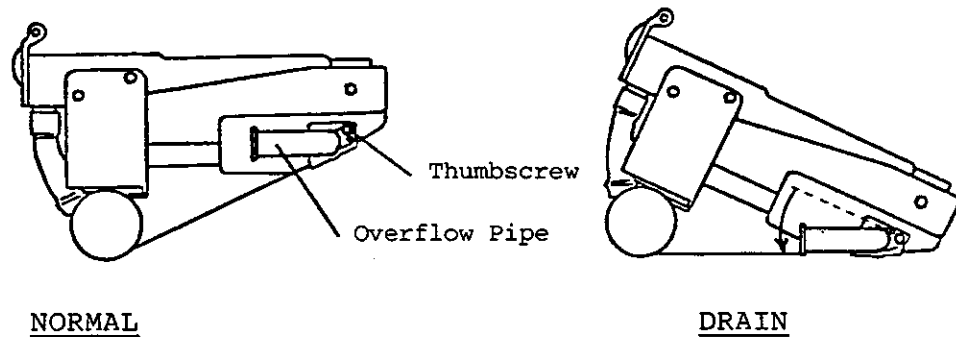


Fig. 16 Overflow Pipe - in High-hardness Areas

5. EXPANSION VALVE

Thermostatic expansion valve is factory adjusted. DO NOT adjust expansion valve, except when replacing or servicing. Adjust valve setting using following procedures.

- 1) Remove cap.
- 2) Rotate adjustment screw, using cap as socket tool.
- 3) Watch dimples of ice cubes produced. Standard setting is that cubes have almost same diameter dimple at both evaporator inlet and outlet. When dimple is larger at inlet, rotate adjustment screw 90 - 180° clockwise. When smaller, counterclockwise. DO NOT rotate more than 90° at a time. Be sure to check if liquid refrigerant returns direct into compressor suction pipe. In case of liquid back, suction line gets being frozen up, resulting in severe damage to compressor.

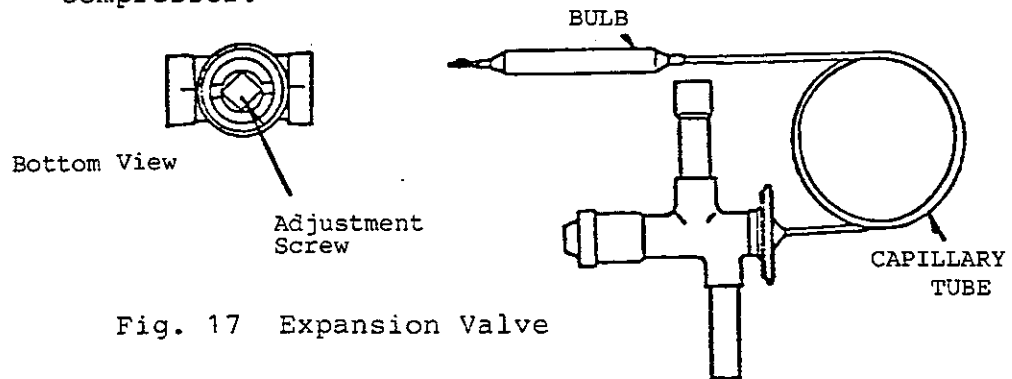


Fig. 17 Expansion Valve

g. REMOVAL AND REPLACEMENT OF THERMISTOR (CUBE CONTROL)

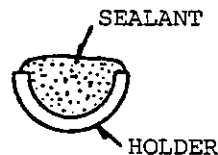
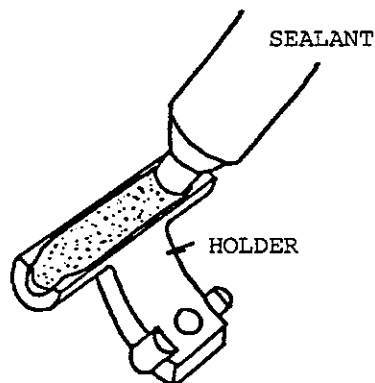
===== [CAUTION] =====

1. FRAGILE, handle the controller board and thermistor very carefully.
2. ALWAYS use the recommended sealant (High Thermal Conductive Type), Model KE4560RTV manufactured by SHINETSU SILICONE, Part Code 60Y000-11, or equivalent.

=====

- (1) Unplug or disconnect power source.
- (2) Remove top panel, front panel and pipe cover (Rear).
- (3) Remove Connector K4 on controller board.
- *(4) Remove screw, and remove Thermistor Holder and Thermistor, located on evaporator (Front).
- (5) Install new thermistor in reverse order, using recommended sealant (High Thermal Conductive Type), Model KE4560RTV, Part Code 60Y000-11, or equivalent.

NOTE: * Be sure to remove all excess sealant and clean thermistor area thoroughly.



** Thermistor and Leads are FRAGILE, HANDLE WITH CARE.

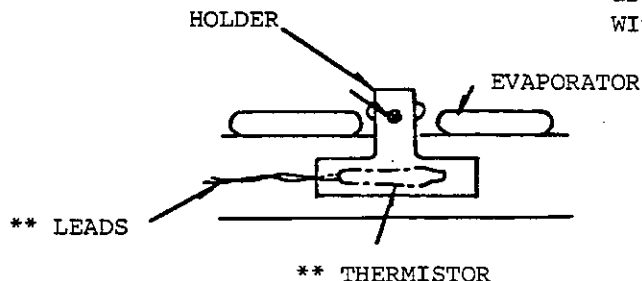


Fig. 18 Removal and Replacement of Thermistor

III. INSTALLATION AND OPERATING INSTRUCTIONS

1. UNPACKING

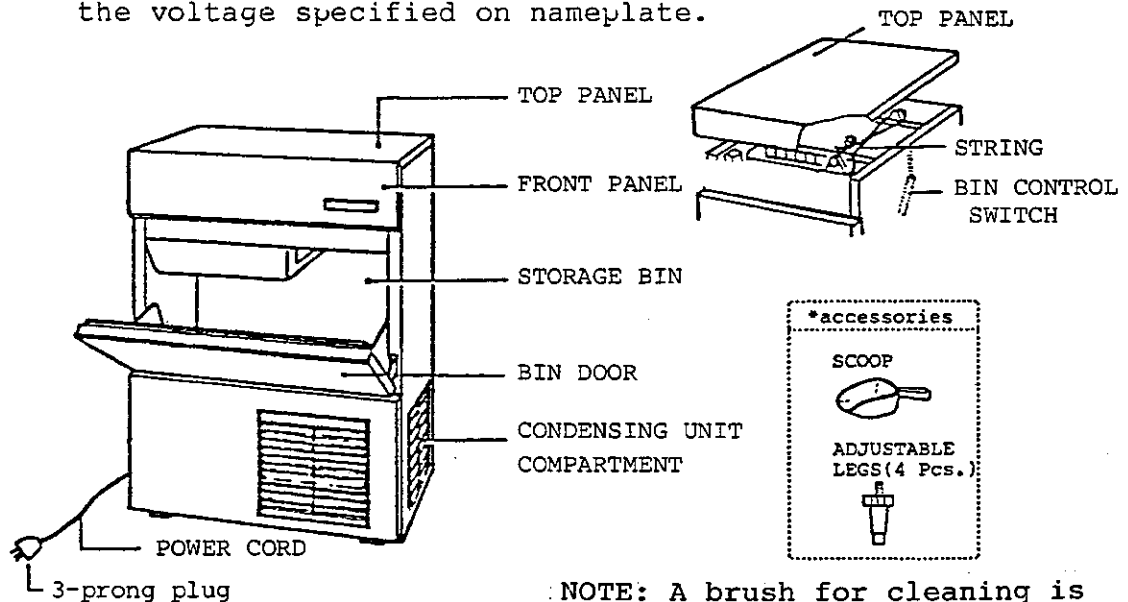
- o Visually inspect exteriors of shipping container.
Any severe damage noted should be reported to the carrier.

===== [WARNING] =====

Remove carton, shipping tapes and packing. If packing material is left in the unit, the icemaker will not work properly and could cause severe damage to the icemaker resulting in failure.

=====

- o Remove shipping tapes holding door and front panel.
- o Remove top panel, and remove string strapping water plate.
- o Remove package containing accessories.
- o Remove shipping tape holding bin control switch.
- o Check that refrigerant lines do not rub or touch lines or other surfaces, and that fan blade moves freely.
- o Check that compressor is snug on all mounting pads.
- o See NAMEPLATE, located on upper right part of left side panel. Check that your source voltage corresponds with the voltage specified on nameplate.



NOTE: A brush for cleaning is provided on IM-132U, -130BAB.

Fig. 19 Unpacking

2. LOCATION

=====[WARNING]=====

This icemaker is not designed for outdoor installation. Air temperatures should be below 100°F(38°C) or above 34°F (1°C). Water temperatures should be below 95°F (35°C) or above 41°F (5°C). Extended period of operation at temperatures exceeding these limitations will constitute misuse resulting in loss of warranty coverage.

=====

1. Install the icemaker in a selected permanent site.

- o Maximum air temperature 100°F (38°C)
Minimum air temperature 34°F (1°C)
- o Maximum water temperature 95°F (35°C)
Minimum water temperature 41°F (5°C)
- o Keep away from heat, and locate near a potable water source and drain.
- o DO NOT install anywhere that drippage might cause damage.
- o Provide 6" (15cm) clearance at rear, sides and top for good ventilation or for easy maintenance and service.

2. Level the icemaker in both left-to-right and front-to-rear directions. Metal shims should be added to corner or side to level the system.

=====[CAUTION]=====

This icemaker will not work properly at sub-freezing temperatures. To prevent the water supply line from freezing, always drain the icemaker when air temperature is below 32°F (0°C).

=====

3. ELECTRICAL CONNECTION

=====[WARNING]=====

This icemaker requires a ground that meets the national and local electrical code requirements. To prevent possible electrical shock to individuals or extensive damage to the equipment, install a proper ground wire to the icemaker.

=====

1. This icemaker must be plugged into a separate power source or receptacle which has enough capacity. The maximum allowable voltage variation should not exceed + or - ten (10) percent of the nameplate rating. See NAMEPLATE.
2. Usually an electrical permit and services of a licensed electrician will be required.

4. WATER SUPPLY AND DRAIN CONNECTIONS

===== [WARNING] =====

To prevent damage to the pump assembly, do not operate this icemaker when the water supply is OFF, or is below 7 PSIG (0.5kg/cm²), the recommended water pressure. DO NOT run the icemaker until proper water pressure is reached.

=====

1. Water supply inlet is 1/2" FPT.
2. Water supply line shut-off valve and drain valve should be installed. And optional strainer should be installed next to water supply inlet in water supply line.
3. Water supply pressure should be minimum 7 PSIG (0.5kg/cm²) and maximum 113 PSIG (8kg/cm²). If pressure exceeds 113 PSIG, use of a pressure reducing valve is required.
4. Drain outlet for dump water is 3/4" MPT.
Drain must be 1/4" fall per 1' (2cm per 1m) on horizontal runs to get good flow.
5. Keep more than 2" (5cm) air gap between drain pipe end and sink.
6. In some cases, a plumbing permit and services of a licensed plumber is required.

NOTE: HOSHIZAKI recommended optional strainer,

Part Code - 311147A01 Cleanout Plug

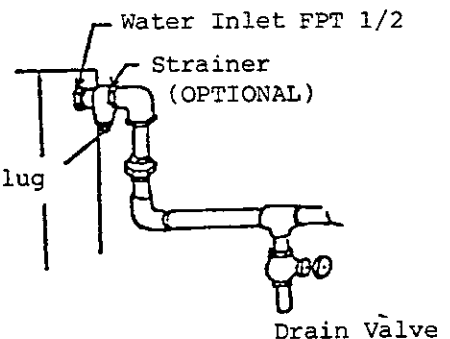


Fig. 20 Water Supply and Drain Connections

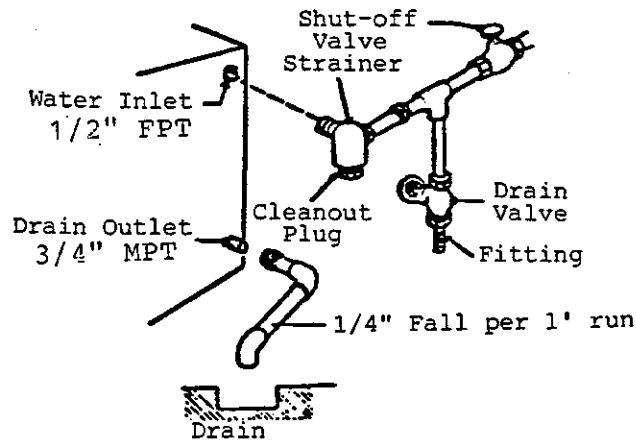


Fig. 21 Water Supply and Drain Connections

5. FINAL CHECK LIST

1. Is the icemaker level?
2. Is the icemaker in a site where ambient temperatures are a minimum of 34°F (1°C) and maximum 100°F (38°C) all year round?
3. Is there at least 6 inch (15cm) clearance around icemaker for easy maintenance or service?
4. Have all shipping tapes, packing and carton been removed from icemaker?
5. Have all electrical and piping connections been made?
6. Has power supply voltage been checked or tested to correspond to the nameplate rating? And has a proper grounding been installed to the icemaker?
7. Are the water supply line shut-off valve and drain valve installed? And has the water supply pressure been checked to ensure a minimum of 7 PSIG (0.5kg/cm²) and maximum 113 PSIG (8kg/cm²)?
8. Have the compressor hold-down bolts and all refrigerant lines been checked against vibration and possible failure?
9. Has bin control switch been checked to work properly?
10. Has the ice storage bin been cleaned and wiped with a clean cloth?
11. Has the user been given the instruction manual, and instructed on how to operate the icemaker and the importance of recommended periodic maintenance?
12. Has the user been given the name and telephone number of an authorized service agency?

6. STARTUP

Check that shipping tape, string and packing are removed before starting the icemaker.

- o Open the water supply line shut-off valve, and plug in.
- o Remove the front panel and move the Washing Switch, on control box to the "ICE" position.
- o Water pan opens first, and then closes into freezing cycle automatically.

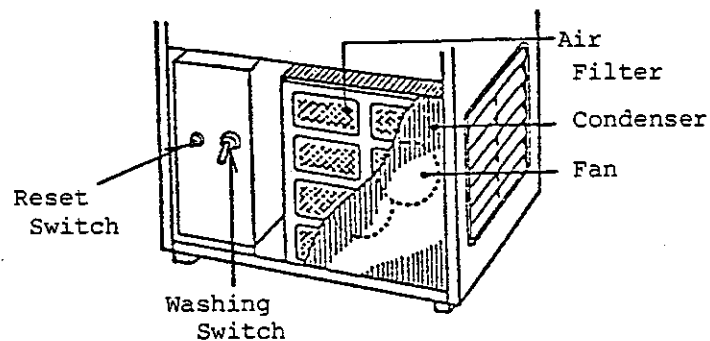
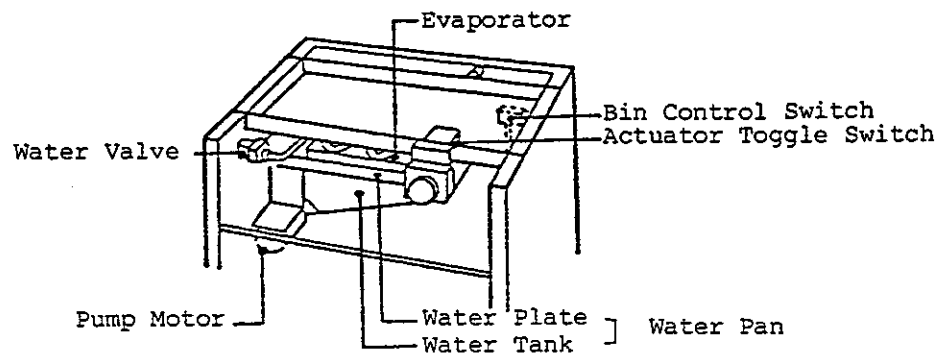


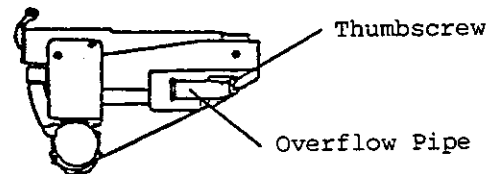
Fig. 22 Startup

7. SHUTOFF

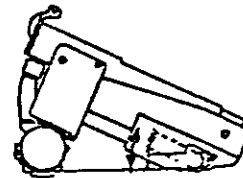
- o Close the water supply line shut-off valve.
- o Press and release the Reset Switch, on front of the control box.
- o Water pan opens, and then actuator toggle switch turns to the "DEFROST" position in forty (40) seconds.
(Click sound will be heard.)
- o Move the Washing Switch to the "OFF" position.
- o When shut off the icemaker for a longer period, drain and remove the ice out of the bin. The storage bin should be cleaned and dried.
(See "TANK DRAIN PROCEDURES")

TANK DRAIN PROCEDURES: for IM-212U, -210BAB

- o Remove the front panel and top panel.
- o Move the Washing Switch on the control box to the "OFF" position.
- o Locate the water pan assembly and remove the thumbscrew.
- o Rotate the Overflow Pipe to the "DRAIN" position.
- o Move washing switch to the "ICE" position.
- o Turn off the icemaker, with the actuator toggle switch in the "DEFROST" position.
- o Return overflow pipe to the "NORMAL" position after drain, and secure with the thumbscrew.



NORMAL



DRAIN

Fig. 23 Tank Drain

SHUTOFF AT SUB-FREEZING TEMPERATURES

===== [WARNING] =====

Drain the icemaker to prevent damage to the water supply line at sub-freezing temperatures, using a foot pump or hand pump. Shut off the icemaker until proper air temperature is resumed.

=====

Procedures:

- o Close the water supply line shut-off valve.
- o Attach the pump and vinyl hose to the drain valve.
- o Move the overflow pipe to the "DRAIN" position, referring to "TANK DRAIN PROCEDURES" above.
- o Press and release the reset switch on the control box.
- o Pump and blow the water supply line.
- o Move the washing switch to the "OFF" position.
- o Unplug the icemaker with the actuator toggle switch in the "DEFROST" position.

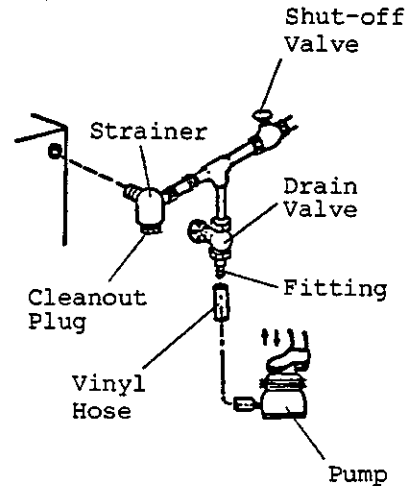
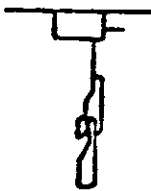


Fig. 24 Shutoff at Sub-freezing Temperatures

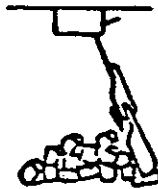
8. BIN CONTROL

Bin control switch assembly is mounted on the upper side of the bin. This switch turns off the unit automatically, when the bin is filled with ice. Handle the bin control switch very carefully, because the switch assembly is FRAGILE. DO NOT touch or poke with scoop, especially while removing ice. And be sure to keep away from the water plate or drain pan, to prevent bin control from being jammed.

Normal
Position



Bin Full
(Tripped)



FRAGILE !!
Keep away from
water plate or
drain pan.

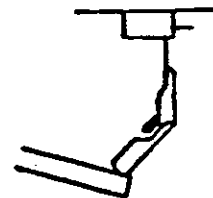


Fig. 25 Bin Control

IV. MAINTENANCE AND CLEANING INSTRUCTIONS

1. MAINTENANCE

===== [IMPORTANT] =====

1. CLEAN AIR FILTER TWICE A MONTH.

2. This icemaker must be maintained individually, referring to the instruction manual and labels provided with the icemaker.

=====

a. EXTERIOR

To keep the exteriors from rusting, wipe occasionally with a clean and soft cloth containing a neutral cleaner to remove oil or dirt.

b. AIR FILTER

A plastic mesh air filter removes dirt or dust in the air, and keeps condenser from getting being clogged. When filter gets clogged, the icemaker performance will be reduced. Clean the filter at least twice a month. More frequent cleaning will be required depending on locations. When clogged by oil, use a warm solution containing a neutral cleaner. Be careful to prevent damage to mesh.

c. CONDENSER

When the condenser becomes clogged by small particles through the air filter, the icemaker performance will be reduced more than air filter clogging. Clean the condenser at least once a year, using a brush or vacuum cleaner. Be careful to prevent damage to fins.

d. WATER VALVE

Metal mesh strainer is provided in water solenoid valve inlet. Mesh removes dirt or particles in water supply, and keeps reservoir or water tank clean. When mesh gets clogged, icemaker will be out of water, similar to trouble due to water failure. Clean mesh at least once a month. More frequent cleaning will be required depending on locations. Remove fitting, and use tiny brush to clean out dirt or particles on mesh. Be careful to prevent damage to mesh.

e. STRAINER (Optional Extra)

Plastic mesh strainer removes dirt or particles, included in water supply. When mesh gets clogged, icemaker will be out of water, similar to trouble due to water failure. Clean mesh at least once a month. Remove cleanout plug, and clean out dirt using tiny brush.

2. CLEANING AND SANITIZING

a. WATER SYSTEM - IM-132U, -130BAB

===== [WARNING] =====

1. Hoshizaki recommends cleaning this unit at least once a year, however more frequent cleaning may be required depending on existing water conditions.
2. To prevent injury to individuals and damage to the icemaker, DO NOT use any ammonia-type cleaner.
3. To prevent skin irritation, always wear Liquid-proof gloves for safe handling of cleaning and sanitizing solutions.

=====

1. Dilute approximately 8 fl. oz. of a recommended cleaner ("LIME-A-WAY", from Economics Laboratory, Inc.) with 1 gal. of water.
2. Remove all ice from storage bin.
3. Remove front panel and top panel.
4. Press and release the reset switch, on front of the control box, and close the water supply line shut-off valve.
5. Move the washing switch, next to the reset switch, to the "WASH" position when the water pan begins to close.
6. As soon as the water pan closes, slowly pour the cleaning solution on water plate.
7. After circulating the cleaning solution for about 30 minutes, open the shut-off valve, and then press the reset switch to remove the solution.
8. After the water pan closes again, circulate clean water for about 5 minutes, and then press the reset switch to remove the rinse water.
9. Repeat above rinse procedure three (3) more times to rinse thoroughly.

10. Dilute approximately 8 fl. oz. of 5.25% Sodium Hypochlorite (Chlorine Bleach) with 1 gal. of water.
11. Press the reset switch, and close the shut-off valve.
12. As soon as the water pan closes, slowly pour the sanitizing solution on water plate.
13. After circulating the solution for about 15 minutes, open the shut-off valve, and then press the reset switch.
14. After the water pan closes again, circulate the clean water for about 5 minutes, and then press the reset switch to remove rinse water.
15. Repeat above rinse procedure two (2) more times.
16. Move the washing switch to the "ICE" position, and start automatic icemaking process. Replace panels.

b. WATER SYSTEM - IM-212U, -210BAB

1. Dilute approximately 16 fl. oz. of a recommended cleaner ("LIME-A-WAY", from Economics Laboratory, Inc.) with 2 gal. of water.
2. Remove all ice from storage bin.
3. Remove front panel and top panel.
4. Remove the thumbscrew, and rotate the overflow pipe to the "DRAIN" position.
5. Press and release the reset switch, on the front of the control box, and close the water supply line shut-off valve.
6. Move the washing switch, next to the reset switch, to the "WASH" position when the water pan begins to close.
7. As soon as the water pan closes, slowly pour the cleaning solution on the water plate.
8. After circulating the cleaning solution for about 30 minutes, open the shut-off valve, and then press the reset switch to remove the solution.
9. After the water pan closes again, circulate the clean water for about 5 minutes, and then press the reset switch to remove rinse water.
10. Repeat above rinse procedure three (3) more times to rinse thoroughly.

11. Dilute approximately 16 fl. oz. of 5.25% Sodium Hypochlorite (Chlorine Bleach) with 2 gal. of water.
12. Press the reset switch, and close the shut-off valve.
13. As soon as the water pan closes, slowly pour the sanitizing solution on the water plate.
14. After circulating the solution for about 15 minutes, open the shut-off valve, and then press the reset switch.
15. After the water pan closes again, circulate clean water for about 5 minutes, and then press the reset switch to remove rinse water.
16. Repeat above rinse procedure two (2) more times.
17. Move washing switch to the "OFF" position.
18. Remove the thumbscrew and overflow pipe from the water tank, and then clean and sanitize the overflow pipe. Rinse thoroughly using clean water.
19. Replace overflow pipe and thumbscrew.
20. Move the washing switch to the "ICE" position, and start automatic icemaking process. Replace panels.

c. STORAGE BIN AND SCOOP

===== [IMPORTANT] =====

- o Wash your hands before removing ice. Use the plastic scoop provided when remove ice.
- o Keep the scoop clean. Clean using a neutral cleaner at least once a day, and rinse thoroughly.
- o Close the bin door after removing ice to prevent dirt, dust or insects into the bin.
- o Clean the bin lining at least once a month, using a neutral cleaner. Rinse thoroughly after cleaning.
- o The storage bin is for ice use only. DO NOT store anything except for ice in the bin.
- o Keep area around the icemaker clean. Dirt, dust or insects on or around the icemaker unit, will cause electrical damage to the equipment, or poison to individuals.

=====

1. Unplug the icemaker, and close the water supply line shut-off valve.
2. Remove front panel and top panel.
3. Open bin door, and remove ice from storage bin.
4. Remove the drain pipe and drain tube from the drain pan.
5. Remove thumbscrews and drain pan, and then take out the drain pan from the storage bin.
6. Remove inner door, bending its center carefully from the one of shafts. And take out inner door from storage bin.
7. Remove bin control switch detector.

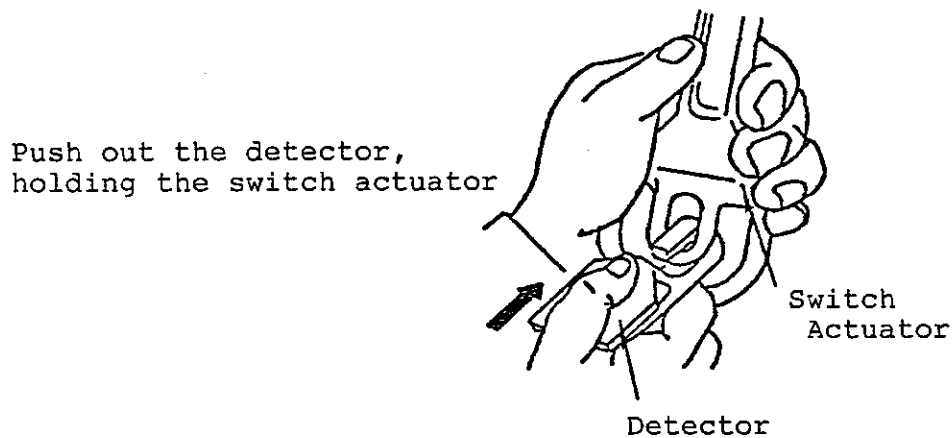


Fig. 26 Bin Control

8. Thoroughly clean and sanitize the drain pan, storage bin, inner door, scoop and any parts of icemaker, which are normally accessible from storage bin.
9. Thoroughly clean and sanitize the bin control switch detector.
10. Replace the drain pan, drain tube and drain pipe.
11. Replace inner door and bin control switch detector.
12. Open the shut-off valve, and move the washing switch, on the front of the control box, to the "ICE" position.
13. Replace the panels, and plug in the icemaker to start automatic icemaking process.

V. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

a. IM-132U, 130BAB

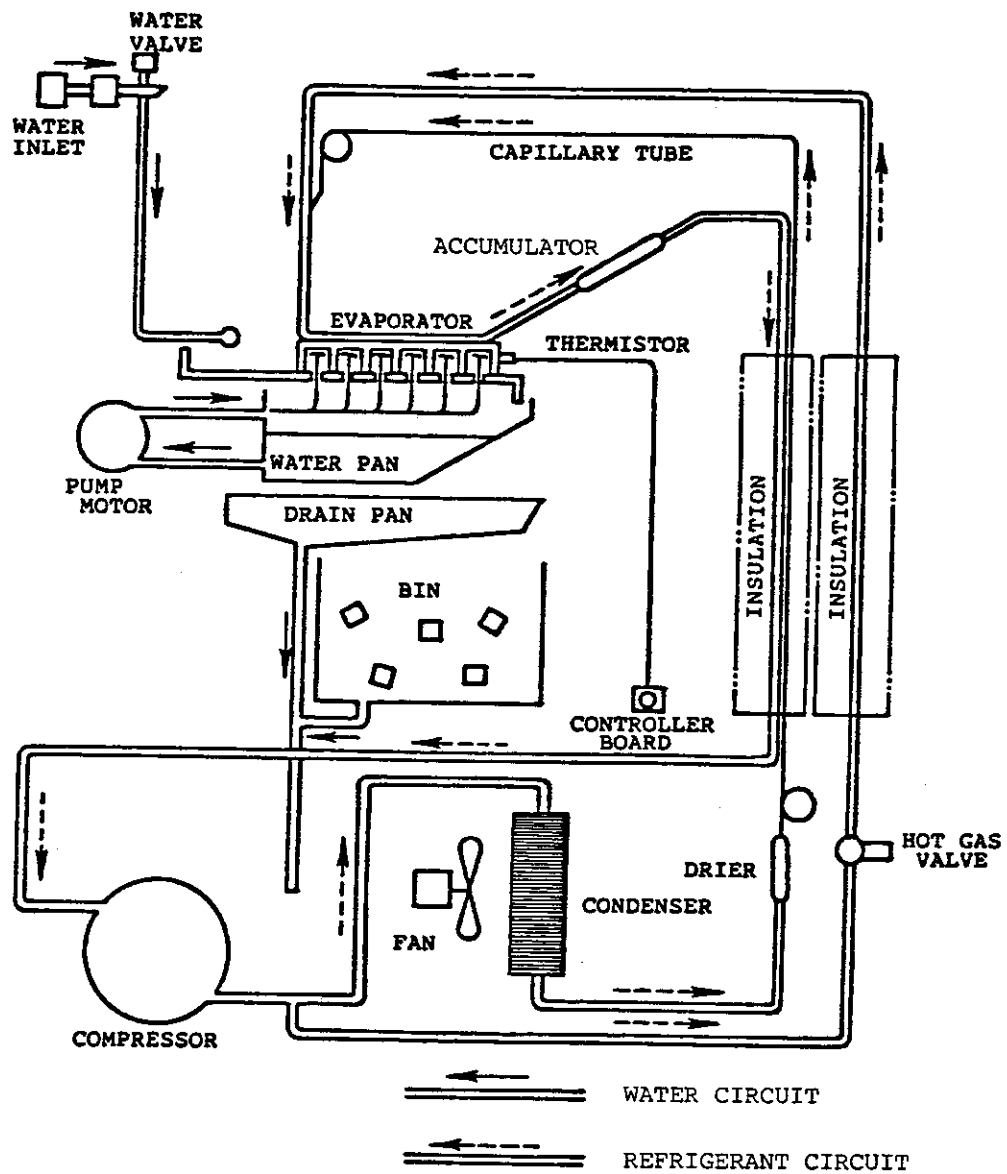


Fig. 27 Water Circuit and Refrigerant Circuit - IM-132U,
IM-130BAB

b. IM-212U, 210BAB

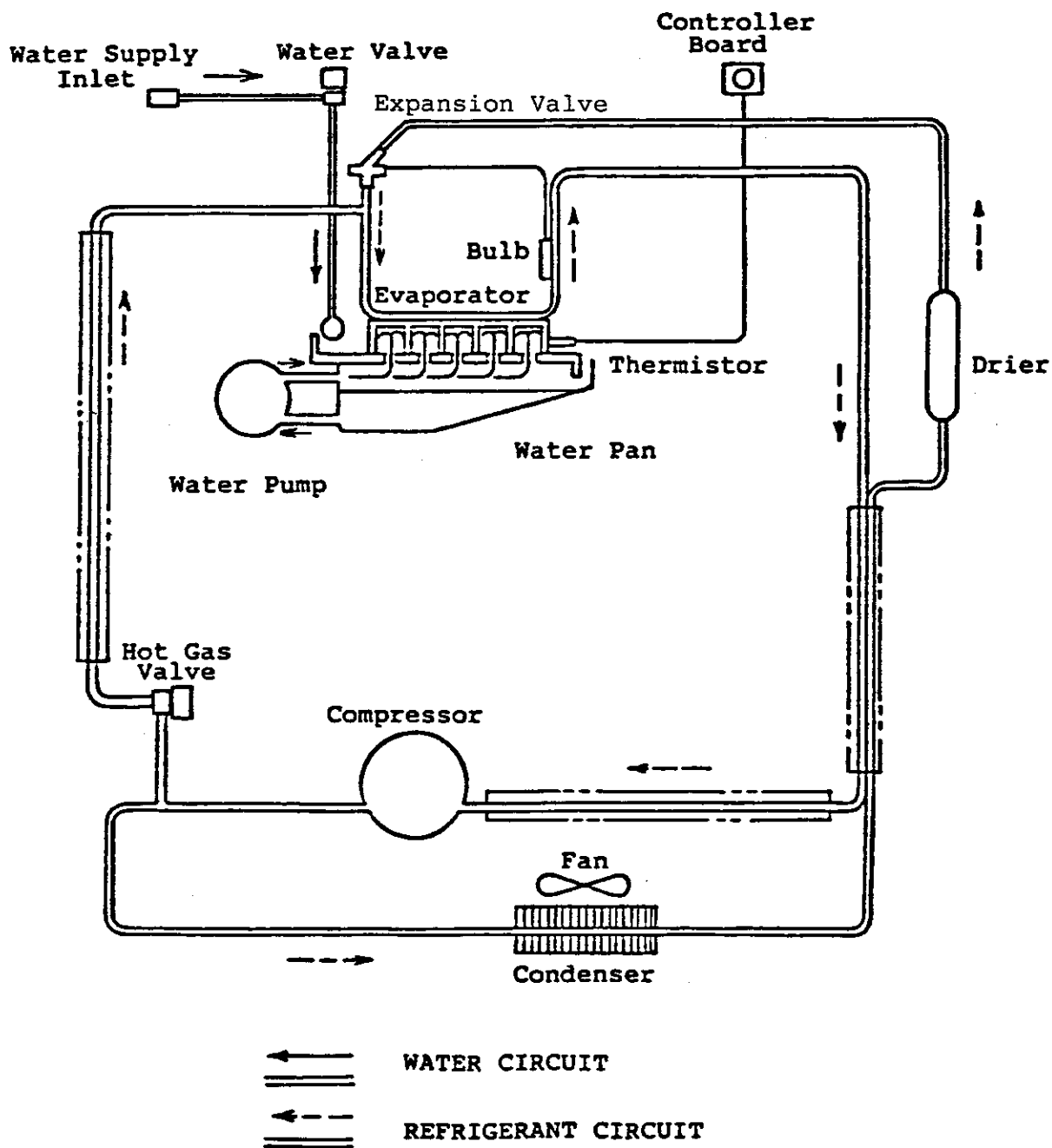
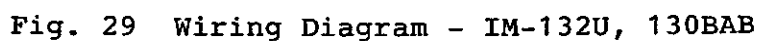


Fig. 28 Water Circuit and Refrigerant Circuit - IM-212U,
IM-210BAB

a. IM-132U, 130BAB



b. IM-212U, 210BAB

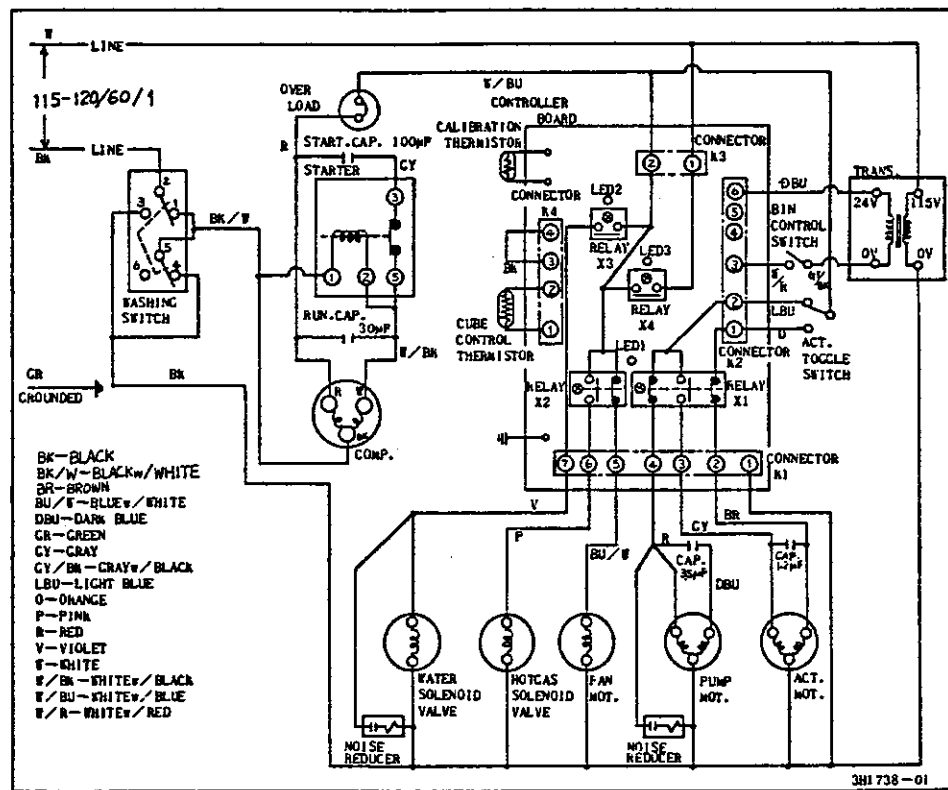


Fig. 30 Wiring Diagram - IM-212U, 210BAB

4. TIMING CHART

a. IM-132U, 130BAB

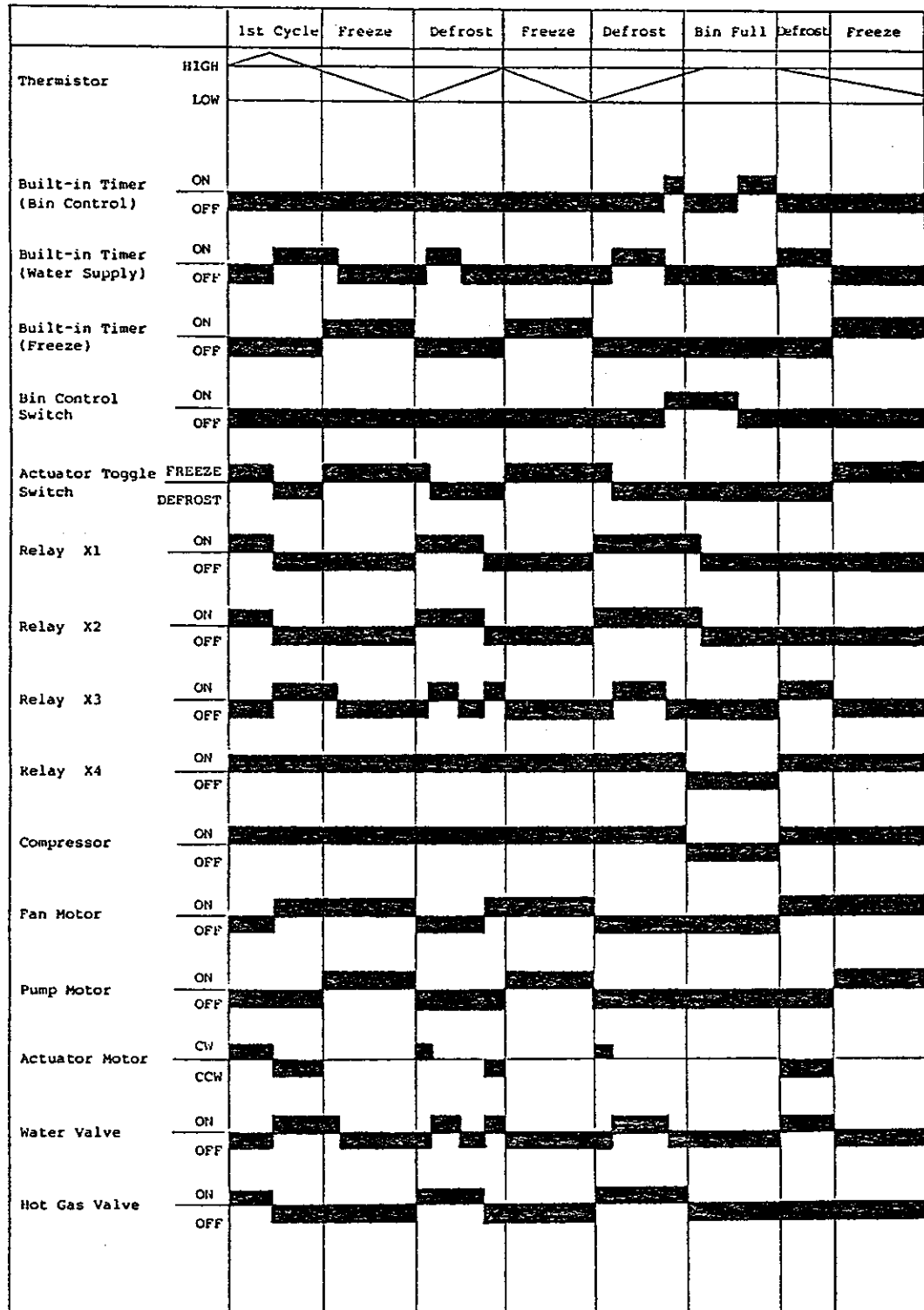


Fig. 31 Timing Chart - IM-132U, 130BAB

b. IM-212U, 210BAB

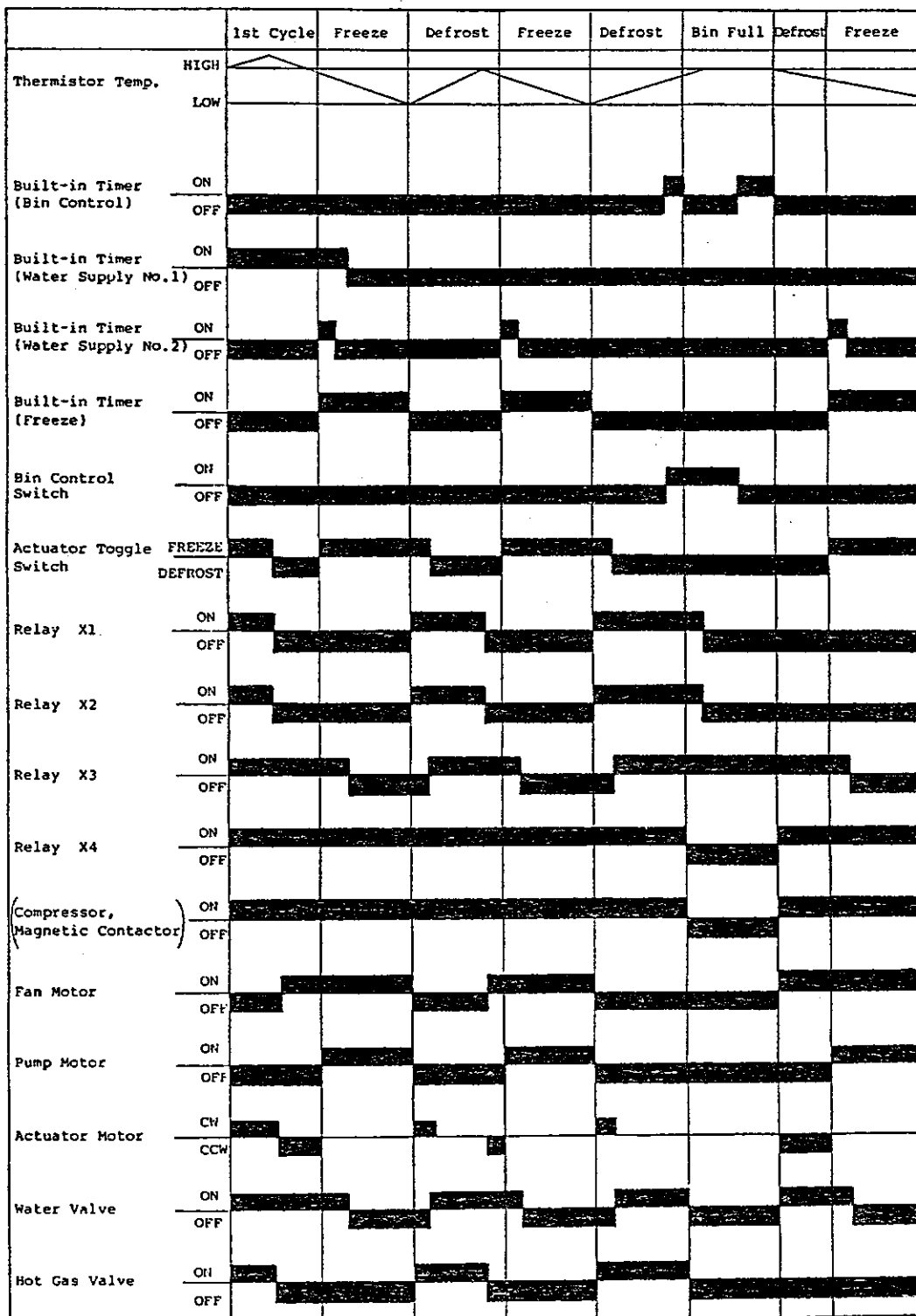


Fig. 32 Timing Chart - IM-212U, 210BAB

4. PERFORMANCE DATA

a. IM-132U-21, 130BAB-21

Tag. 5 Performance Data - IM-132U-21, 130BAB-21

Water Temp. (°F) Ambient Temp. (°F)	Ice Production Capacity (lbs/day) (kg/day)			Freeze Cycle Time (min)			Harvest Cycle Time (min)			Head Pressure (PSI) (kg/cm ²)			Suction Pressure (PSI) (kg/cm ²)			Electric Consumption (W)			Water Consumption (gal/day) (m ³ /day)		
	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90
70	123	106	93	12	14	17	3.0	3.0	3.0	118	124	128	14	16	18	385	395	405	297	253	221
	56	48	42							8.3	8.7	9	1.0	1.2	1.3				1.1	1.0	0.8
80	117	101	83	13	16	18	2.5	2.5	2.5	137	144	149	16	18	21	410	420	430	278	239	210
	53	46	40							9.6	10.1	10.5	1.1	1.3	1.5				1.1	0.9	0.8
90	108	95	84	15	17	19	2.3	2.3	2.3	156	164	168	18	21	23	420	430	440	257	229	202
	49	43	38							11	11.5	11.8	1.3	1.5	1.6				1.0	0.9	0.8
100	99	88	79	16	19	21	2.0	2.0	2.0	181	189	196	20	22	26	430	440	460	236	208	185
	45	40	36							12.7	13.3	13.8	1.4	1.6	1.8				0.9	0.8	0.7

Note: * First 5 minutes, in Freezing Cycle

NOTE: ALLOW 10% VARIATION FROM DATA FOR ERRORS.

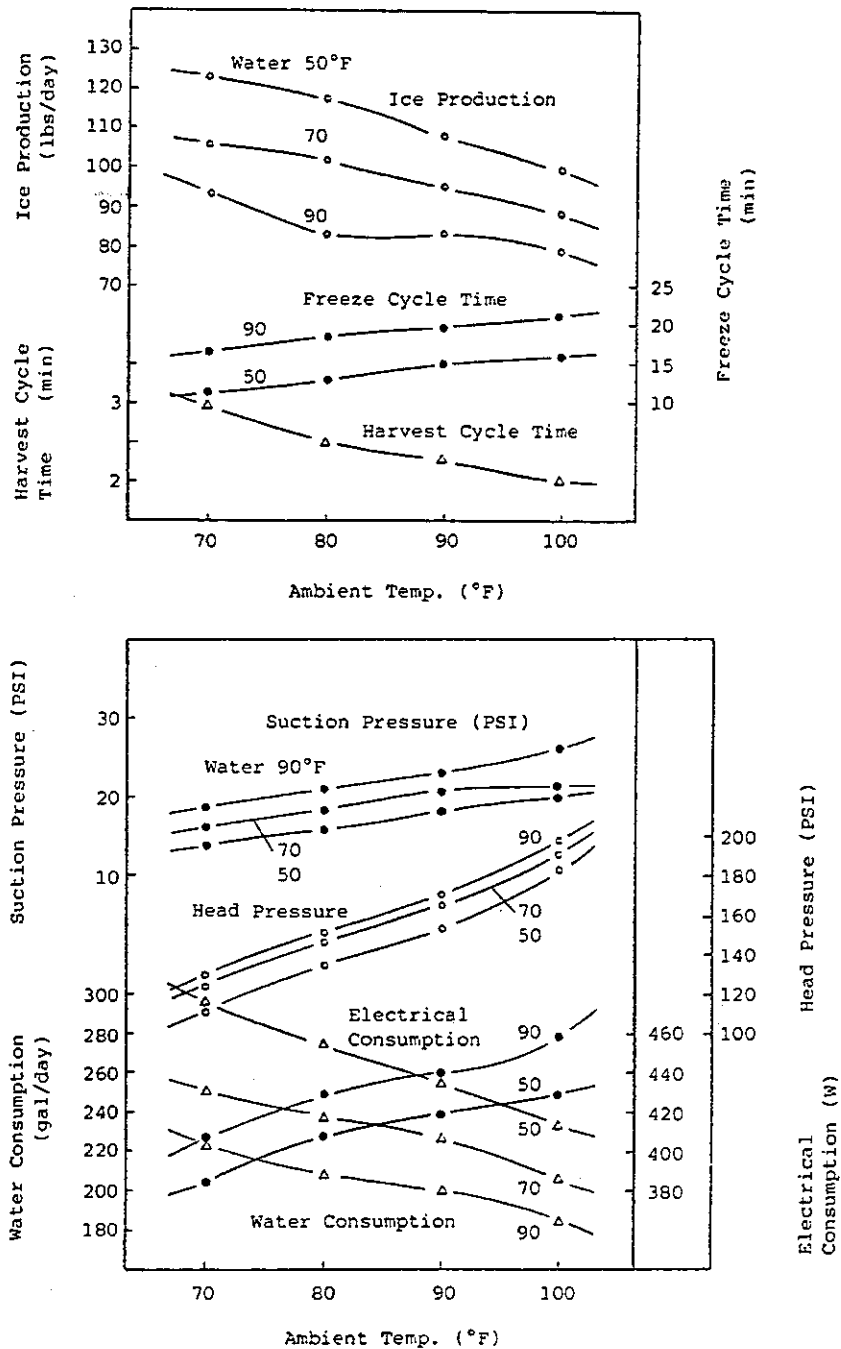


Fig. 33 Performance Data - IM-132U-21. 130BAB-21

b. IM-132U-25

Tab. 6 Performance Data - IM-132U-25

Water Temp. Ambient Temp. (°F)	Ice Production Capacity (lbs/day) (kg/day)			Freeze Cycle Time (min)			Harvest Cycle Time (min)			Head Pressure (PSI) (kg/cm²)			Suction Pressure (PSI) (kg/cm²)			Electric Consumption (W)			Water Consumption (gal/day) (m³/day)		
	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90
70	123	106	93	15	18	21	3.5	3.5	3.5	119	127	134	15	17	20	395	410	420	233	199	175
	56	48	42							8.4	8.9	9.4	1.1	1.2	1.4				0.88	0.75	0.66
80	117	101	83	17	20	23	3.0	3.0	3.0	141	148	154	17	19	21	410	420	430	221	192	166
	53	46	40							9.9	10.4	10.8	1.2	1.4	1.5				0.84	0.73	0.63
90	108	95	84	19	22	25	2.7	2.7	2.7	159	166	173	18	21	23	430	440	450	204	178	158
	49	43	38							11.2	11.7	12.2	1.3	1.5	1.7				0.77	0.67	0.60
100	99	88	79	21	24	27	2.5	2.5	2.5	186	196	201	20	23	27	440	450	465	187	166	149
	45	40	36							13.1	13.8	14.1	1.4	1.7	1.9				0.71	0.63	0.56

Note: * First 5 minutes, in Freezing Cycle

NOTE: ALLOW 10% VARIATION FROM DATA FOR ERRORS.

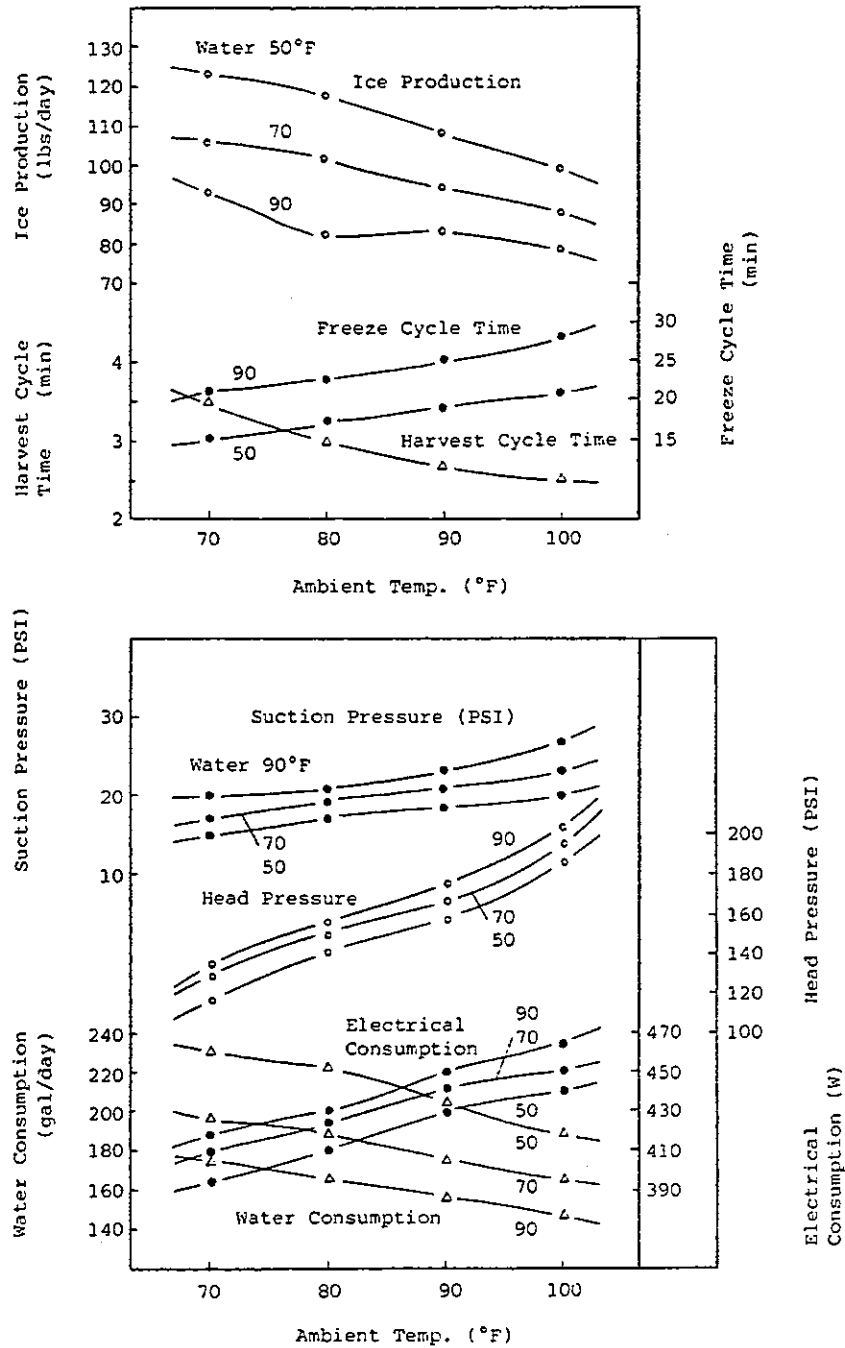


Fig. 34 Performance Data - IM-132U-25

c. IM-212U-21, 210BAB-21

Tag. 7 Performance Data - IM-212U-21, 210BAB-21

Water Temp. Temp. (°F)	Ice Production Capacity (lb./day) (kg/day)			Freeze Cycle Time (min)			Harvest Cycle Time (min)			Head Pressure (PSI) (kg/cm ²)			Suction Pressure (PSI) (kg/cm ²)			Electric Consumption (W)			Water Consumption (gal./day) (m ³ /day)		
	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90
70	198	172	157	16	18	20	3.0	3.0	3.0	108	115	122	16	20	24	700	740	750	190	163	149
	90	78	71							7.6	8.1	8.6	1.1	1.4	1.7				0.72	0.62	0.56
80	190	163	148	17	20	22	2.5	2.5	2.5	128	135	142	18	21	26	715	755	785	144	125	113
	86	74	67							9.0	9.5	10.0	1.3	1.5	1.8				0.55	0.47	0.43
90	181	154	139	18	22	24	2.2	2.2	2.2	146	154	161	19	23	27	740	770	795	118	101	91
	82	70	63							10.3	10.8	11.3	1.4	1.6	1.9				0.45	0.38	0.34
100	172	146	130	19	23	26	2.0	2.0	2.0	172	178	186	21	24	28	750	795	800	101	84	77
	78	66	59							12.1	12.5	13.1	1.5	1.7	2.0				0.38	0.32	0.29

Note: * First 5 minutes, in Freezing Cycle

NOTE: ALLOW 10% VARIATION FROM DATA FOR ERRORS.

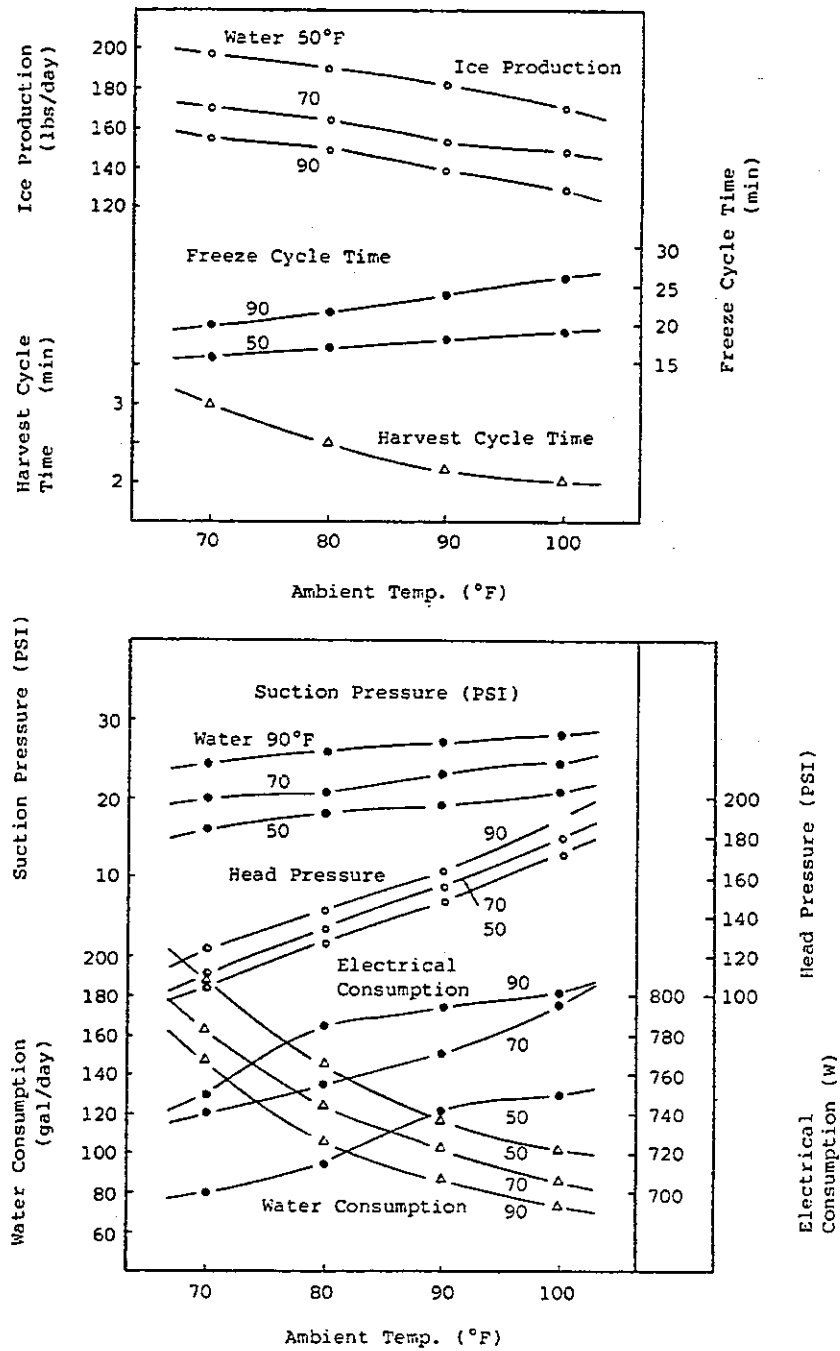


Fig. 35 Performance Data - IM-212U-21, 210BAB-21

VI. SERVICE DIAGNOSIS

1. NO ICE PRODUCTION

Tab. 8 Service Diagnosis - No Ice Production

TROUBLE	POSSIBLE CAUSE		REMEDY
1) Icemaker will not start.	BIN CONTROL SWITCH	Out of position	Place in position
		Defective	Replace
	CONTROLLER BOARD	-	See "Checking Controller Board"
	POWER CORD	Loose connection	Connect correctly
		Open circuit	Repair, or replace
	POWER SOURCE	OFF position	Move to ON position
		Loose connection, or misconnection	Connect correctly
		Poor contacts	Replace
	STORAGE BIN	Filled with ice	Remove ice
	WASHING SWITCH	OFF position	Move to ICE position
2) Compressor will not start.	AIR FILTER, CONDENSER	Clogged	Clean referring to "Maintenance"
	COMPRESSOR	Defective	Replace
	COMPRESSOR CIRCUIT	Loose connection or broken wire	Repair, or replace
	OVERLOAD	Defective	Replace
	REFRIGERANT CHARGE	Overcharged	Purge refrigerant, or recharge correctly
	RUNNING CAPACITOR	Defective	Replace
	STARTER	Defective	Replace
	STARTING CAPACITOR	Defective	Replace

Tab. 8 Service Diagnosis - No Ice Production (Cont'd)

2) Cont'd	TEMPERATURE	Ambient too high	Cool location site
	VOLTAGE	Low	Use correct voltage
3) Compressor runs intermittently.	CONTROLLER BOARD	-	See "Checking Controller Board"
4) Compressor runs, but other components will not start.	CONTROL CIRCUIT	Loose connection or broken wire	Repair, or replace
5) Fan Motor will not run.	ACTUATOR TOGGLE SWITCH	Defective	Replace
	FAN MOTOR	Defective	Replace
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	WIRING	Loose connection, or broken wire	Repair, or replace
6) Out of water.	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	WATER SUPPLY LINE	Clogged, or low pressure	Clean, or use correct pressure
	WATER VALVE	Clogged	Clean referring to "Maintenance"
7) Too much water in water tank.	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	WATER VALVE	Defective, or clogged	Replace, or clean referring to "Maintenance"
8) Pump Motor will not run.	ACTUATOR TOGGLE SWITCH	Defective	Replace
	CONTROLLER BOARD	-	See "Checking Controller Board"
	MECHANICAL SEAL	Burned friction surface	Replace
	PUMP MOTOR	Defective	Replace

Tab. 8 Service Diagnosis - No Ice Production (Cont'd)

8) Cont'd	WIRING	Loose connection, or broken wire	Repair, or replace
9) Pump runs, but will not discharge water.	DISCHARGE TUBE	Clogged	Clean
		Out of position	Place in position
	IMPELLER	Broken	Replace
		Out of position	Repair, or place in position
	MECHANICAL SEAL	Worn out friction surface	Replace
	VOLTAGE	Low	Use correct voltage
10) Water Pan will not open.	ACTUATOR MOTOR, RUNNING CAPACITOR	Defective	Replace
	ACTUATOR TOGGLE SWITCH	Defective	Replace
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	VOLTAGE	Low	Use correct voltage
	WIRING	Loose connection, or broken wire	Repair, or replace
11) Water Pan will not close.	HOT GAS VALVE	Defective	Replace
	See "10." above	-	-

2. LOW ICE PRODUCTION

Tab. 9 Service Diagnosis - Low Ice Production

TROUBLE	POSSIBLE CAUSE		REMEDY
1) Water Pan takes too long to open.	AIR FILTER, CONDENSER	Clogged	Clean referring to "Maintenance"
	REFRIGERANT CHARGE	Overcharged, or too low	Recharge correctly, or check for leaks
	REFRIGERANT CIRCUIT	Trapped air or moisture	Replace drier, evacuate system, and recharge correctly
	TEMPERATURE	Ambient too high	Cool location site
		Water too warm	Contact plumber
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	VOLTAGE	Low	Use correct voltage
2) Water Pan takes too long to close.	EVAPORATOR	Dirty, or built up scale	Clean, or remove scale
		Defective	Replace
	FAN MOTOR	Runs during DEFROST cycle	Check wiring and actuator toggle switch
	HOT GAS VALVE	Defective	Replace
	REFRIGERANT CHARGE	Too low	Check for leaks, and recharge correctly
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"

3. ABNORMAL ICE

Tab. 10 Service Diagnosis - Abnormal Ice

TROUBLE	POSSIBLE CAUSE		REMEDY
1) Large-dimple cubes.	AIR FILTER, CONDENSER	Clogged	Clean referring to "Maintenance"
	EXPANSION VALVE	Poorly adjusted	Readjust
	MECHANICAL SEAL IN PUMP ASSY	Worn out friction surface	Replace
	POWER SOURCE	Power loss	Check, and repair
	PUMP MOTOR	Worn out bearing	Replace
	REFRIGERANT CHARGE	Too low	Check for leaks, and recharge correctly
	TEMPERATURE	Ambient too high	Cool location site
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	WATER SUPPLY LINE	Low pressure	Use correct pressure
	WATER VALVE	Clogged	Clean referring to "Maintenance"
2) Cloudy cubes.	MECHANICAL SEAL IN PUMP ASSY	Worn out friction surface	Replace
	PUMP MOTOR	Worn out bearing	Replace
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
	VOLTAGE	Low	Use correct voltage
	WATER PLATE	Clogged jet holes	Clean
	WATER SUPPLY LINE	Low pressure	Use correct pressure
		Dirty	Check strainer, and clean referring to "Maintenance"

Tab. 10 Service Diagnosis - Abnormal Ice (Cont'd)

2) Cont'd	WATER SYSTEM	Dirty, or built up scale	Clean, or remove scale
	WATER VALVE	Clogged	Clean referring to "Maintenance"

4. OTHERS

Tab. 11 Service Diagnosis - Others

TROUBLE	POSSIBLE CAUSE		REMEDY
1) Pump Motor, Fan Motor or Actuator Motor continues to run.	ACTUATOR TOGGLE SWITCH	Defective	Replace
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
2) Slab does not break into separate cubes.	CLEARANCE (Between Evaporator and Water Plate)	Too much	Readjust
	EVAPORATOR	Dirty, or built up scale	Clean, or remove scale
		Defective	Replace
	EXTENSION SPRING	Overextended	Replace
	THERMISTOR, CONTROLLER BOARD	-	See "Checking Controller Board"
3) Ice maker will not stop, when bin is filled with ice.	BIN CONTROL SWITCH	Out of position	Place in position
		Defective	Replace
	CONTROLLER BOARD	-	See "Checking Controller Board"
4) Abnormal noise.	ACTUATOR MOTOR	Worn out gears	Replace
	COMPRESSOR	Worn out bearing, or broken cylinder valve	Replace
	FAN MOTOR	Worn out bearing	Replace
	PUMP MOTOR	Worn out bearing	Replace
5) Ice storage often melts.	BIN DRAIN	Clogged, or backflows	Clean, or repair

VII. CHECKING CONTROLLER BOARD

1. CHECKING CONTROLLER BOARD

===== [IMPORTANT] =====

When received a service call, ask the user to TURN OFF ICEMAKER, AND TURN ON AGAIN, watching the icemaker. In some cases, proper operation will be resumed by this.

=====

===== [WARNING] =====

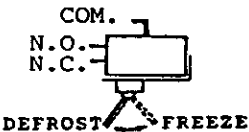
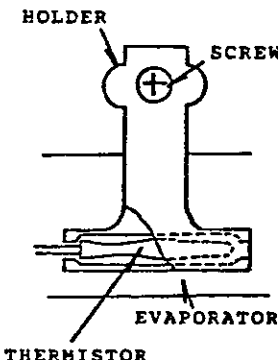
1. FRAGILE, handle a controller board very carefully.
2. The controller board contains CMOS (Complementary Metal Oxide Semiconductor) integrated circuits, SUSCEPTIBLE TO FAILURE DUE TO STATIC DISCHARGE. It is specifically important that an anti-static wrist strap must be used when handling or replacing the board.
3. DO NOT touch electronic devices on the board, or the back of the board, to prevent damage to the board.
4. DO NOT change wiring and connections.
5. DO NOT fix any electronic devices or parts on the board in the field. ALWAYS replace the whole board assembly, when it goes bad.
6. ALWAYS remove the Frame Ground Wire, when attempting to check the unit for INSULATION RESISTANCE and/or DIELECTRIC WITHSTAND.
7. Be sure to ground the icemaker for normal operation. And the Signal Ground Wire and Frame Ground Wire must be connected to Shield Plate and to Control Box Base respectively, when replacing the board after service.

=====

2. BEFORE CHECKING CONTROLLER BOARD

Check for power source voltage and components as indicated in table below.

Tab. 12 Before Checking Controller Board

Locate	Procedures	Normal
<p>1. ACTUATOR TOGGLE SWITCH</p> 	<p>Manually set switch to "FREEZE" or "DEFROST (HARVEST)" position, and check for continuity.</p>	<p>DEFROST COM-NO open COM-NC close</p> <p>FREEZE COM-NO close COM-NC open</p>
<p>2. THERMISTOR (on Evaporator)</p> 	<p>———— CAUTION ————</p> <p>Thermistor sensor portion (glass sealed) is FRAGILE. Handle very carefully.</p> <ul style="list-style-type: none"> o Disconnect leads at K4 Connector on controller board. o Remove screw and holder on evaporator. o Immerse sensor portion in a glass containing ice and water for 5 minutes. o Check for resistance between K4 connector pins. 	<p>5 to 7 kOhm</p>
<p>3. BIN CONTROL</p>	<p>Manually set bin control switch to "TRIP" or "RESET" position, and check for period.</p>	<p>Approximate</p> <p>TRIP 10sec RESET 80sec</p>

3. VISUAL CHECK AND VOLTAGE CHECK

Visually check LED INDICATORS located next to variable resistors VR4 - VR2 on controller board.

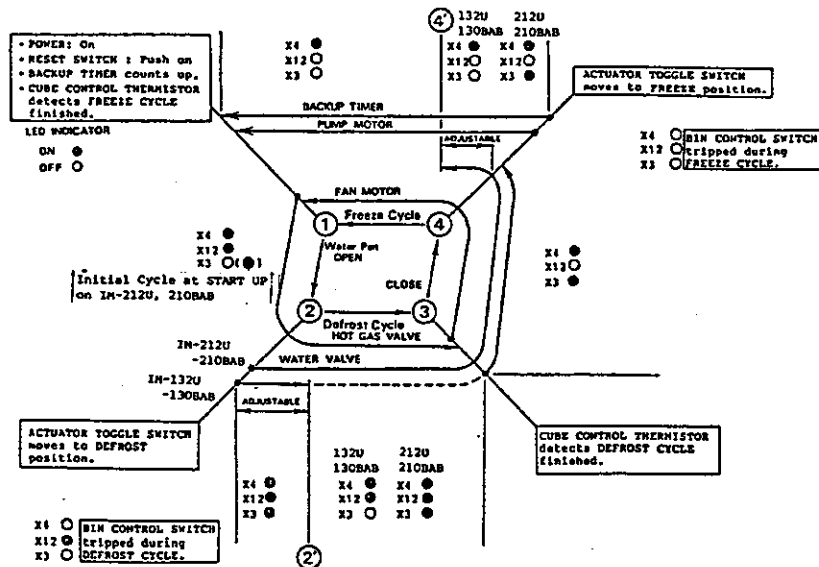


Fig. 36 Visual Check - LED Indicators Pattern

Three (3) LED's blink as sequential operation progresses step by step, showing ON/OFF patterns.

Locate connectors and connectors' pin number, and check for voltage on components using tester (Range 250VAC).

Tab. 13 Voltage Check - See next page 51-A for bigger table

Sequence		LED Indicators			Voltage Check					
		LED3 X4	LED1 X1,2	LED2 X3	PUMP	ACTUAT MOT	FAN MOT	HOT GAS	WATER	COMP
BASIC	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	0V	115V
	2 → 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
	3 → 4 Water Pan close	•	•	•	0V	*115V	115V	0V	115V	115V
	4 → 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	115V	115V
132U 130BAB	Initial	•	•	•	115V	0V	115V	0V	0V	115V
	Normal	•	•	•	115V	0V	115V	0V	0V	115V
	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	0V	115V
	2 → 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
212U 210BAB	3 → 4 Water Pan Close	•	•	•	0V	*115V	115V	0V	115V	115V
	4 → 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	0V	115V
	Initial	•	•	•	0V	*115V	0V	115V	0V	115V
	Normal	•	•	•	0V	*115V	0V	115V	0V	115V
212U 210BAB	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	115V	115V
	2 → 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
	3 → 4 Water Pan Close	•	•	•	0V	*115V	115V	0V	115V	115V
	4 → 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	0V	115V

Table: Connector and Pin Number

PUMP MOTOR	K1 PIN1 - PIN4
ACTUATOR MOTOR	*K1 P1 - P2 **K1 P1 - P2
FAN MOTOR	K1 P1 - P5
HOT GAS VALVE	K1 P1 - P6
WATER VALVE	K1 P1 - P7
COMPRESSOR	K1 P1 - K3 P2

Tab. 13 Voltage Check

Sequence		LED Indicators		Voltage Check						
		LED3 X4	LED1 X1,2	LED2 X3	PUMP	ACTUAT MOT	FAN MOT	HOT GAS	WATER	COMP
		•	•	•	0V	*115V	0V	115V	0V	115V
BASIC	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	0V	115V
	2 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
	3 4 Water Pan Close	•	•	•	0V	*115V	115V	0V	115V	115V
	4 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	115V	115V
132U 130BAB	Initial	•	•	•	115V	0V	115V	0V	0V	115V
	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	0V	115V
	2 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
	3 4 Water Pan Close	•	•	•	0V	*115V	115V	0V	115V	115V
212U 210BAB	4 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	0V	115V
	1 → 2 Water Pan open	•	•	•	0V	*115V	0V	115V	115V	115V
	2 3 Defrost Cycle	•	•	•	0V	0V	0V	115V	115V	115V
	3 4 Water Pan Close	•	•	•	0V	*115V	115V	0V	115V	115V
4 1 Freeze Cycle	4 1 Freeze Cycle	•	•	•	115V	0V	115V	0V	0V	115V
	Initial	•	•	•	115V	0V	115V	0V	0V	115V
	Normal	•	•	•	0V	*115V	0V	115V	0V	115V
	115V	•	•	•	0V	0V	0V	115V	115V	115V

Table: Connector and Pin Number

PUMP MOTOR	K1 PIN1 - PIN4
ACTUATOR MOTOR	*K1 P1 - P3 **K1 P1 - P2
FAN MOTOR	K1 P1 - P5
HOT GAS VALVE	K1 P1 - P6
WATER VALVE	K1 P1 - P7
COMPRESSOR	K1 P1 - K3 P2

4. REPLACEMENT

===== [CAUTION] =====

The controller board is FRAGILE. Handle the board very carefully to prevent damage to the board, electronic devices and connectors. An anti-static wrist strap must be worn, to prevent damage to the delicate circuitry due to static electricity. And always use miniature tools to adjust tiny parts.

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Be sure that service package includes:

- o CONTROLLER BOARD 1Pc
- o LABEL (for Controls) 1Pc
- o INSTRUCTIONS 1Pc

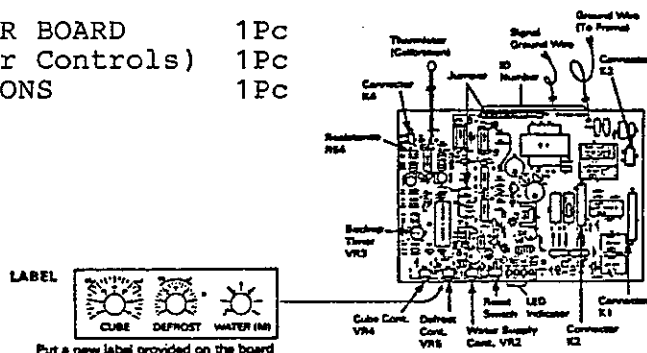


Fig. 37 Replacement Board

NOTE: A defective board, if necessary, should be returned for inspections, with the board packed in anti-static bag, and protected by foamed plastic sheet, in order to prevent additional damage to the board.

1. Remove front panel.
2. Unplug or disconnect power source.
3. Remove screws and control box cover.
4. Pull shield plate slightly toward you, and disconnect signal ground wire.
5. Disconnect frame ground wire.
6. Push pawl of removable plastic cable tie, and loose it. DO NOT cut off removable cable tie.
7. Cut off plastic cable tie holding frame ground wire and thermistor (Calibration) in control box.
8. Pull out controller board halfway, and disconnect leads at connectors K1, K2, K3 and K4.
9. Pull out and remove controller board from control box.
10. Install a new controller board in reverse order.

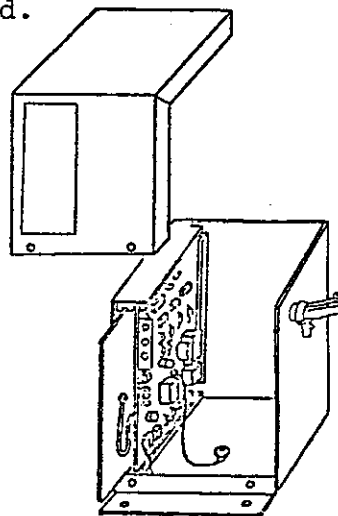


Fig. 38 Control Box

VIII. REMOVAL AND REPLACEMENT

1. REMOVAL OF PANELS

1) TOP PANEL

Remove screw at front, and pull up on front portion, disconnecting hook at rear.

2) LOUVERS - Front and Sides

Remove screw. And push and decline, and then pull up toward you.

3) REAR PANEL

Remove screws and rear panel.

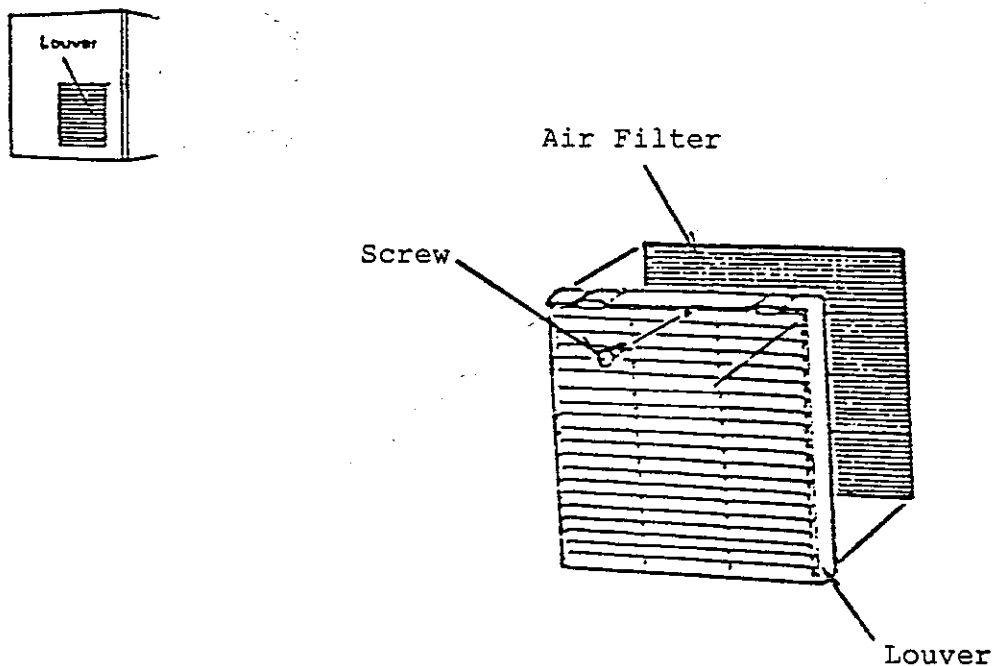


Fig. 39 Removal of Panels

2. SERVICE FOR REFRIGERANT LINES

===== [DANGER] =====

1. Refrigerant R12 is not flammable, explosive and poisonous. However, when exposed to an open flame, R12 creates Phosgene gas, hazardous in large amounts.
2. ALWAYS purge the system through a hose vented to the outside, because it is very dangerous for the room to be filled with R12, as this easily replaces the oxygen supply.
3. DO NOT use silver or copper alloy containing Arsenic.

=====

NOTE: All solder-connections on the refrigerant circuit components are clear-paint coated. Sandpaper the solder-connections before unsolder the components. Use a good abrasive cloth to remove paint.

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

a. REFRIGERANT DISCHARGE

Any refrigerant access valve is not provided with the unit. Compressor process tube is brazed to seal the refrigerant system. Discharge refrigerant cutting pigtail like process tube on the compressor. Install a proper refrigerant access valve or service port on the process tube for easy service. And install, if necessary, a proper port on the high-side line to check for head pressure.

b. EVACUATION AND RECHARGE

- (1) Attach charging hoses, service manifold and vacuum pump to system.
- (2) Turn on vacuum pump.
- (3) Allow vacuum pump to pull down to 29.9"Hg vacuum. Evacuation time depends on pump capacity.
- (4) Close low-side valve on service manifold.
- (5) Disconnect vacuum pump, and attach refrigerant service cylinder. Be sure to loose connection, and purge air from hose.
See NAMEPLATE for required refrigerant charge.
- (6) Open low-side valve. DO NOT invert service cylinder. 'LIQUID CHARGE' results in damage to compressor.
- (7) Turn on icemaker, when charging speed gets slow. Turn off icemaker, when low-side gauge shows around 0 PSIG (0kg/cm²). DO NOT run icemaker at vacuum pressures. Close low-side valve, when service cylinder gets empty.
- (8) Repeat steps No.4 through No.7 above, if necessary, until required amount of refrigerant enters system.
- (9) Close refrigerant access valve, and disconnect hoses and service manifold.
- (10) Cap refrigerant access valve to prevent possible leak. Or pinch off and braze service line to seal system, if necessary.

3. REMOVAL AND REPLACEMENT OF COMPRESSOR

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

- (1) Unplug or disconnect power source.
- (2) Remove louver (Right) and rear panel.
- (3) Purge refrigerant from system.

- (4) Remove terminal cover on compressor, and disconnect solderless compressor wiring.
- (5) Remove Discharge and Suction pipes using brazing equipment.
- (6) Remove hold-down bolts, washers and grommets.
- (7) Slide out and remove compressor.
- (8) Unpack new compressor.
- (9) Attach grommets of old compressor to new compressor.
- (10) Sandpaper suction and discharge pipes.
- (11) Place compressor in position, and secure with Bolts and Washers.
- (12) Remove plugs from suction and discharge pipes.
- (13) Braze Access, Suction and Discharge lines, with Nitrogen gas flowing at pressures of 3 - 4 PSIG (0.2 - 0.3kg/cm²). DO NOT change this order.
- (14) Install replacement drier.
- (15) Check for leaks using Nitrogen gas (140 PSIG) and soap bubbles.
- (16) Connect compressor wiring, and replace terminal cover.
- (17) Evacuate system, and charge refrigerant. See NAMEPLATE for required refrigerant charge.
- (18) Replace panels.
- (19) Plug in or connect power source.

4. REMOVAL AND REPLACEMENT OF DRIER

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

- (1) Unplug or disconnect power source.

- (2) Remove front panel, rear panel and protective cover.
And move control box toward you.
- (3) Purge refrigerant from system.
- (4) Remove strap for drier, if any, and move drier toward you
for easy service.
- (5) Remove drier using brazing equipment.
- (6) Braze new drier, with ARROW on drier, in direction of
refrigerant flow. Use Nitrogen gas at pressures of
3 - 4 PSIG (0.2 - 0.3kg/cm²) while brazing.
- (7) Check for leaks using Nitrogen gas (140 PSIG) and soap
bubbles.
- (8) Evacuate system, and charge refrigerant. See NAMEPLATE
for required refrigerant charge.
- (9) Replace control box and panels.
- (10) Plug in or connect power source.

5. REMOVAL AND REPLACEMENT OF EXPANSION VALVE

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

- (1) Unplug or disconnect power source.
- (2) Remove top panel.
- (3) Purge refrigerant from system.
- (4) Remove straps and expansion valve bulb.
- (5) Disconnect solder-connections on expansion valve, using
brazing equipment.
- (6) Braze new expansion valve, with Nitrogen gas flowing at
pressures of 3 - 4 PSIG (0.2 - 0.3kg/cm²).
- (7) Install replacement drier.

- (8) Check for leaks using Nitrogen gas (140 PSIG) and soap bubbles.
- (9) Evacuate system, and charge refrigerant. See NAMEPLATE for required refrigerant charge.
- (10) Attach expansion valve bulb to suction line, and secure in place with straps.
- (11) Replace top panel.
- (12) Plug in or connect power source.

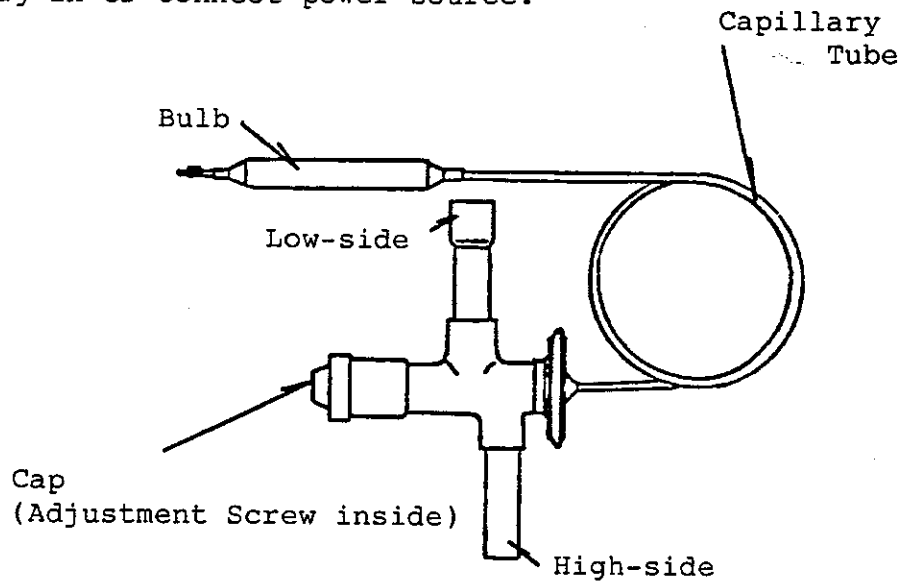


Fig. 40 Removal and Replacement of Expansion Valve

6. REMOVAL AND REPLACEMENT OF EVAPORATOR

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

- (1) Remove Water Pan Assembly, referring to "REMOVAL AND REPLACEMENT OF WATER PAN ASSEMBLY".
- (2) Remove solder-connections on evaporator using brazing equipment.
- (3) Remove four (4) nuts mounting evaporator.

- (4) Install new evaporator, and secure with bolts, spacers and nuts.
- (5) Braze pipes, with Nitrogen gas flowing at pressures of 3 - 4 PSIG (0.2 - 0.3kg/cm²).
- (6) Install replacement drier.
- (7) Check for leaks using Nitrogen gas (140 PSIG) and soap bubbles.
- (8) Evacuate system, and charge refrigerant. See NAMEPLATE for required refrigerant charge.
- (9) Replace panels.
- (10) Plug in or connect power source.

7. REMOVAL AND REPLACEMENT OF HOT GAS VALVE

===== [IMPORTANT] =====

ALWAYS install a new drier, any time the sealed refrigeration system is opened. DO NOT replace the drier until after all other repairs or replacements have been made.

=====

- (1) Unplug or disconnect power source.
- (2) Remove front panel, rear panel and protective cover. And move control box toward you.
- (3) Disconnect hot gas valve leads.
- (4) Remove mounting screw and solenoid.
- (5) Remove solder-connections using brazing equipment.
- (6) Install new valve. ALWAYS protect valve body using wet rag, to prevent damage to valve due to overheat. DO NOT braze valve with valve body exceeding 250°F (120°C). Use Nitrogen gas at pressures of 3 - 4 PSIG (0.2 - 0.3kg/cm²) while brazing.
- (7) Install replacement drier.
- (8) Check for leaks using Nitrogen gas (140 PSIG) and soap bubbles.

- (9) Evacuate system, and charge refrigerant. See NAMEPLATE for required refrigerant charge.
- (10) Replace solenoid in reverse order.
- (11) Connect leads.
- (12) Replace control box and panels.
- (13) Plug in or connect power source.

8. REMOVAL AND REPLACEMENT OF WATER PAN ASSEMBLY

- (1) Remove top panel.
- (2) Remove front panel, and push reset switch on control box, to open water pan.
- (3) Unplug or disconnect power source.
- (4) Remove flexible metal conduit on pump motor. And disconnect wire connectors in metal raceway.
- (5) Remove two (2) springs from cam arms.
- (6) Remove water plate bracket and water pan assembly.
- (7) Remove two (2) bosses from water tank.
- (8) Remove screws and water plate bracket.
- (9) Remove pump Suction and Discharge tubings.
- (10) Remove pump motor bracket from water plate.
- (11) Install new water plate and water tank in reverse order.
- (12) Replace panels.
- (13) Plug in or connect power source.

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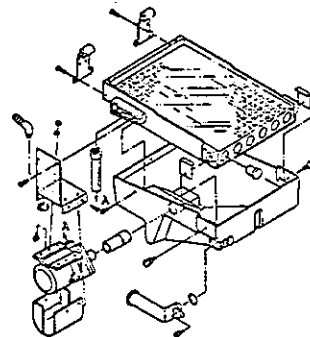


Fig. 41 Removal and Replacement of Water Pan Assembly

9. REMOVAL AND REPLACEMENT OF ACTUATOR MOTOR

- (1) Remove top panel.
- (2) Remove front panel, and push reset switch on control box to open water pan.
- (3) Unplug or disconnect power source.
- (4) Remove spring (Front) from cam arm.
- (5) Remove flexible metal conduit on actuator motor. And disconnect wire connectors in metal raceway.
- (6) Remove actuator motor bracket.
- (7) Remove roll pin securing shaft to cam arm.
- (8) Remove cover for actuator motor, and actuator motor.
- (9) Install new actuator motor in reverse order.
- (10) Check and adjust so that cam arm moves actuator toggle switch to "FREEZE" or "DEFROST" position normally.
- (11) Replace panels.
- (12) Plug in or connect power source.

10. REMOVAL AND REPLACEMENT OF CAM ARM

- 1) CAM ARM (A) - located at front

Refer to "REMOVAL AND REPLACEMENT OF ACTUATOR MOTOR".

- 2) CAM ARM (B) - located at rear

- (1) Remove top panel.
- (2) Remove front panel, and push reset switch on control box to open water pan.
- (3) Unplug or disconnect power source.
- (4) Remove spring from cam arm (B).
- (5) Remove cotter pin from cam shaft.
- (6) Remove cam arm (B).
- (7) Install new cam in reverse order.

- (8) Replace panels.
- (9) Plug in or connect power source.

11. REMOVAL AND REPLACEMENT OF PUMP MOTOR

- (1) Unplug or disconnect power source.
- (2) Remove top panel.
- (3) Remove flexible metal conduit on pump motor. And disconnect wire connector in metal raceway.
- (4) Remove screws and pump motor from bracket.
- (5) Disconnect pump Suction and Discharge tubings.
- (6) Disassemble pump motor, and check motor or parts.
- (7) Install new motor or parts in reverse order.
- (8) Plug in or connect power source, and check for water leaks.
- (9) Replace panel.

12. REMOVAL AND REPLACEMENT OF WATER VALVE

- (1) Close water supply line shut-off valve.
- (2) Unplug or disconnect power source.
- (3) Remove top panel.
- (4) Remove clamp and valve outlet tubing.
- (5) Remove fitting and water valve. And then move water valve toward you.
- (6) Disconnect water valve wiring and grounding conductor from water valve.
- (7) Install new valve in reverse order.
- (8) Open shut-off valve.
- (9) Plug in or connect power source.
- (10) Check for water leaks.

(11) Replace panel.

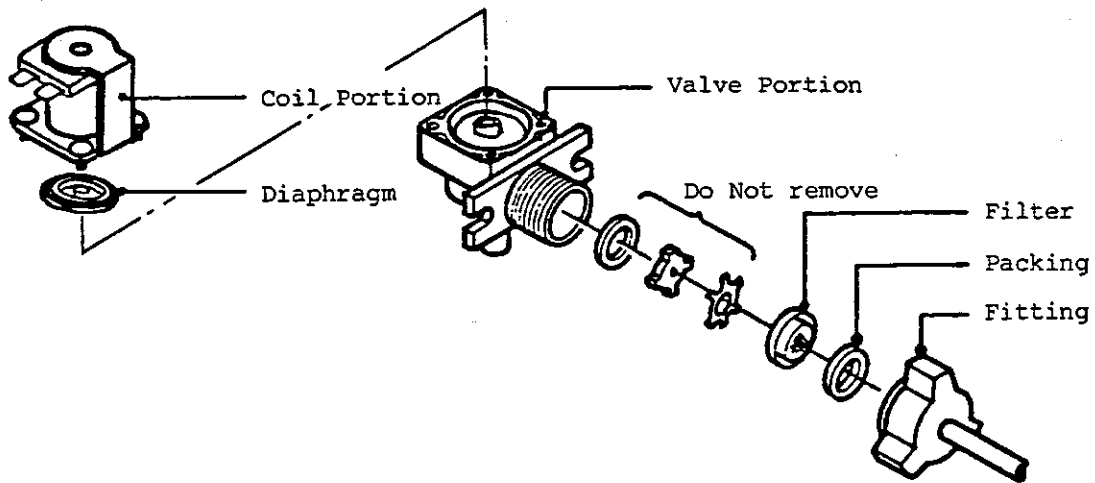


Fig. 42 Removal and Replacement of Water Valve

13. REMOVAL AND REPLACEMENT OF FAN MOTOR

- (1) Unplug or disconnect power source.
- (2) Remove louvers (Sides).
- (3) Remove front panel.
- (4) Remove control box and protective cover, if any.
- (5) Remove wire connectors from fan motor leads.
- (6) Remove mounting bracket and fan motor.
- (7) Install a new fan motor in reverse order.

14. REMOVAL AND REPLACEMENT OF ACTUATOR TOGGLE SWITCH

- (1) Unplug or disconnect power source.
- (2) Remove Top Panel.
- (3) Remove hex nut mounting actuator toggle switch.
- (4) Disconnect leads.
- (5) Install new actuator toggle switch in reverse order.
- (6) Replace panel.
- (7) Plug in or connect power source.

15. REMOVAL AND REPLACEMENT OF BIN CONTROL

Removal

BRACKET COVER

Push two (2) pawls and remove bracket cover.

MICROSWITCH

Pull on leads carefully.

SWITCH ACTUATOR

Drive up switch actuator very carefully. Be careful not to damage cam surface of switch actuator.

DETECTOR

Push out detector holding switch actuator.

Replacement

SWITCH ACTUATOR

Insert lower shaft, and push along "U" notch. Be sure to check that switch actuator moves freely.

MICROSWITCH AND BRACKET COVER

Replace switch lever first, and then attach switch in position. Insert guide, and then push bracket cover to lock.

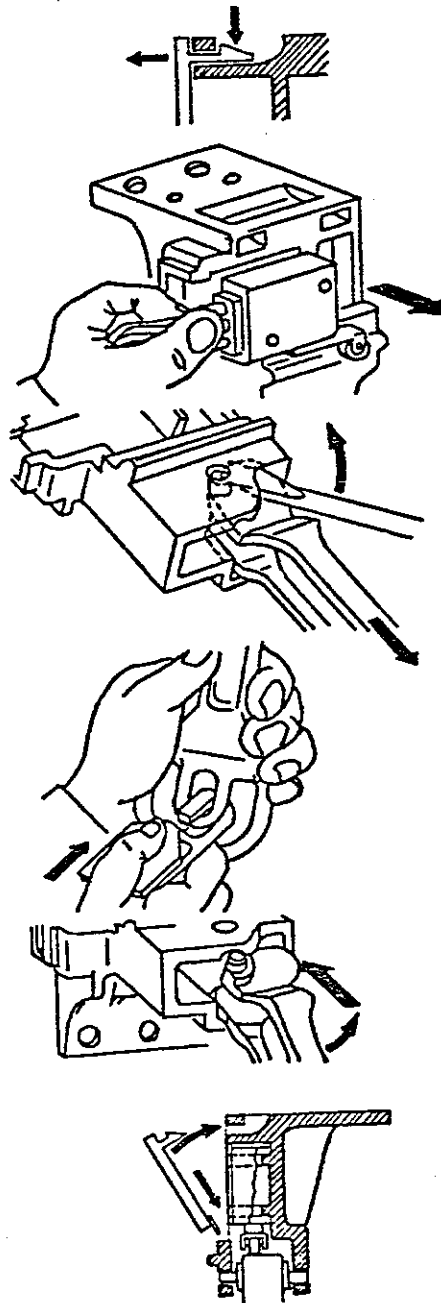


Fig. 43 Removal and Replacement of Bin Control

